THE VALUES OF SCIENCE WORKSHOPS IN GASTON COUNTY

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by
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R. F. M.

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INTRODUCTION

"Let's have a workshop where we can actually do things!"

"Now that's the kind of workshop we want!"

"Please wait until after school begins this fall to have the next workshop, for we want to come, too."

When statements and requests like these are made by in-service teachers, when attendance at the workshops quadruple previous expectations, and when interest and enthusiasm in activities carried on during the workshop are expressed in numerous ways, there is not great cause for deep concern as to whether the workshop is of value and whether favorable results will follow. Drastic changes in science instruction, however, will not be evident overnight. Time is an important element that must be given consideration. Then, too, results will be both tangible and intangible; some may be measured by direct methods, while others may be detected only through improved methods of instruction in the classroom, through increased interest and enthusiasm of both teachers and pupils in science activities, through the teacher's feeling of security, and through greatly reduced truancy and discipline problems.

Formal instruction solely from a textbook is rapidly becoming an obsolete method of teaching. Competition with

radio and television is challenging the schools of today; criticism of education has come into the open. Many are the avenues through which teaching can be, and is being, made more interesting and more effective.

I. THE PROBLEM

Statement of the problem. This study was made in an effort (1) to follow trends which may have contributed to improved methods of science instruction after science workshops were held; (2) to show the relation between methods and techniques used in these situations with such factors as age, sex, grade level, scholarship, and location of schools; (3) to attempt to determine where the schools now stand relative to science education and in what direction they are moving; and (4) to present interests of teachers and students and their participation in science activities as revealed through personal interviews and questionnaire study.

Importance of the study. The increasing complexities of human society make it imperative that some understanding of the principles of modern science be taught to every child in the public schools. Children are a definite part of this scientific age in which science plays an important part in

their development.[1] Changes are so swift that no definite promise for the future can be made.[2] Children in schools today may in the future use means of transportation, communication, and technology that have not yet been imagined. To prevent children from becoming overwhelmed by swift changes in economic dislocations, by violent competition for raw materials and markets, and by the ever increasing tempo of destructive warfare, the schools must train them to meet life with confidence and competence. The science program in the elementary school can do much toward helping them to understand the order and rhythm in change--an understanding which will, perhaps, help to allay any potential fears and anxieties possibly destructive of mental health.[3]

During the past few decades more progress has been made in the field of science than in any other field of human endeavor.[4] Children need a greater knowledge and understanding of how science influences their lives and

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[1] Herman and Nina Schneider, "Role of Science in Child Development," National Educational Association Journal, 42: 433, October, 1953.

[2] Ibid.

[3] Ibid., p. 435.

[4] V. Carl Ilgen (ed.), Science for Today's Children, Thirty-second Yearbook of the Department of Elementary School Principals, National Education Association (Washington, D. C.: National Education Association, 1953), p. v.

how they can use it to the greatest advantage for themselves and for posterity.

Very often the lack of self-confidence of classroom teachers and the feeling that they do not have the proper background for initiating an effective elementary school science program are grave handicaps. Because they have had very little training in interpreting the commonplace science experiences that should make up an elementary school science program, they often feel unable to initiate one.

Culture change has had a tremendous impact upon the science curriculum.[5] With the advent of the automobile, the radio, the airplane, and television, many new words have been added to the everyday language of the people. Naturally the cultural changes have affected the language and content of science textbooks. The bombing of Nagasaki and Hiroshima ushered in the atomic age, which added new words and phrases to the common language of the people. Students in both elementary and high school are interested today in aeronautics, diesel engines, jet propulsion, and nuclear energy and use fluently new words connected with each of these subjects.[6]

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[5]Robert H. Alexander, "The Impact of Culture Change on the Science Curriculum," Curriculum Bulletin Number 134, State Board of Education (Eugene, Oregon: University of Oregon, 1954), p. 8.

[6]Ibid., p. 1.

Methods of teaching science are changing greatly, too. There is a moving away from memorization of facts and isolated problem solving to a study of those things which contribute to man's well being, that meet the needs, interests, and abilities of the students in school.[7]

Current literature favors conservation, race relations, world peace, mental health, human betterment, consumer problems, the use of leisure time, recreation, and atomic energy and its utilization, as the content of science courses.[8] The trend is away from such specialized courses as biology, physics, and chemistry, and toward the integration of a wide range of science fields into courses labeled Science I, Science II, et cetera. These courses may include social sciences in addition to natural sciences.[9]

The formal laboratory situation may be losing the indispensable place it has long held in science instruction. More emphasis is being placed on training in critical thinking and problem solving than on the traditional laboratory experiments. Since the advent of compulsory education, emphasis has shifted from a subject-centered curriculum to child-centered schools. Thus, as new ideas become a part

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[7] Ibid., p. 6.

[8] P. De H. Hurd, "Mid-Century Trends in Science Teaching," California Journal of Secondary Education, 28:246, May, 1953.

[9] Ibid., p. 247.

of present-day culture, the curriculum of the public school changes. Mankind has come to realize that there is a need for better cooperation and understanding among the nations of the world, and that science and technology can contribute much to man's happiness and well-being.[10]

The ever-increasing need for better informed citizens demands that more attention be given to the physical sciences that will be of use to all students after they finish high school, regardless of their environment. Special emphasis should be given to an analysis of the resources of the community and the needs and interests of the students.[11] Other writers also stress the growing need for a wider understanding of science.[12]

There is a need for change in methods of training elementary science teachers. They often tend to teach as they were taught, and if they have a feeling of inadequacy, it may result from their thinking of science as the "formal and often meaningless courses they took in high school and

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[10] Ibid.

[11] George G. Mallison and Jacqueline V. Buck, "The Coming of General Physical Science," Clearing House, 28: 158, November, 1953.

[12] Gerald Piel, "Need for Public Understanding of Science," Science, 121:317, March 4, 1955.

college."[13] But many teachers, feeling that the pupils need more experiences in science, want to find ways to help fill this need. They want to know how they can use the community resources to improve their science teaching, how their science teaching may become a part of the total school program, how they can perform simple experiments with inexpensive materials, and how they can plan the science program to meet the needs and interests of children.[14]

"The big problem seems to be that of helping the classroom teachers develop background in science subject matter and confidence to teach."[15]

One of the most successful techniques for helping teachers develop a feeling of security and self-confidence in initiating a successful science program in the classroom is through a "workshop" affording them the opportunity to

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[13]Walter A. Thurber, "Role of the Science Consultant," Science for Today's Children, Thirty-second Yearbook of the Department of Elementary School Principals, National Education Association (Washington, D. C.: National Education Association, 1953), p. 28.

[14]Glenn O. Blough and Paul E. Blackwood, Science Teaching in Rural and Small Town Schools, Bulletin No. 5 (Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1949), p. 19.

[15]Glenn O. Blough, "Science in the Elementary School," Science for Today's Children, Thirty-second Yearbook of the Department of Elementary School Principals, National Education Association (Washington, D. C.: National Education Association, 1953), p. 8.

study and work with materials they will use in their science teaching. They gain assurance that they and their children, working cooperatively, will achieve success.[16]

At the request of teachers in both the elementary and secondary schools of Gaston County, this type of workshop has been held each year for four consecutive years. This report is a portrayal of satisfactory evidence that these workshops have been of definite value to the teachers in initiating an effective elementary science program in their classrooms.

II. DEFINITIONS OF TERMS USED

Workshop. The term workshop is founded upon the idea that teachers "learn to do by doing." They work in a workshop; they work to get assistance in solving their problems.[17]

The Encyclopedia of Modern Education defines the term thus:

> A teacher's workshop is an experience-centered study undertaken by a group of mature persons. The group takes as its starting point the interests and needs of its members, and sub-groups are formed to insure a profitable interchange of opinion, knowledge, and experience. Consultants, rather than instructors, serve these groups, placing specialized resources at the disposal both in

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[16] Thurber, op. cit., p. 28.

[17] Frank S. Allen, "The Workshop: Does It Deliver?" Bulletin of the National Association of Secondary School Principals, 34:225, December, 1950.

> group discussions and the exploration of individual problems and plans. The characteristics of this simple, informal, and functional organization are its flexibility and its relevance to specific tasks which the members wish to undertake more skillfully and with clearer vision after the workshop period.[18]

In-service training. An in-service training program is designed for those teachers who are already working in the classroom; it provides continuous growth and development of the abilities relevant to good teaching.

Pre-service training. Before teachers begin actual experience in the classroom, it is necessary for them to prepare for teaching by satisfactorily completing a prescribed program of courses. This preparatory training is designed to broaden their knowledge and understanding of plans and procedures for effective instruction.

Methods. The plan or procedure followed in doing a given kind of work, or in achieving a given end, is a method. It may denote an abstract or a concrete procedure, but, in either case, orderly, logical, and effective arrangement is implied.

Media. The plural form of the word medium designates means through which, or by which, anything is accomplished.

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[18] Ibid.

Techniques. The manner in which information and data were secured is designated as techniques.

Evaluation. An evaluation of any plan or procedure is a careful weighing of results to determine the real value of the situation.

Primary department. Throughout this study the term primary department has been used to refer to grades one through three.

Intermediate department. Grades four through six are included in the term intermediate department.

Junior high department. This term was used to refer to grades seven and eight.

High school. The term high school is used to refer to grades nine through twelve.

Grammar grades. All grades from fourth through eighth are included in the term grammar grades.

III. DESCRIPTION OF TERRITORY AND SCHOOLS STUDIED

Gaston County is located in the South Piedmont District of North Carolina. Cleveland County adjoins it on the west and Lincoln County on the north. The Catawba River, which separates Gaston and Mecklenburg Counties, is the eastern

boundary, and the state of South Carolina adjoins it on the south. Figure 1, page 12, shows the location of Gaston County in North Carolina.

Gaston County has an area of 358 square miles and a total population of approximately 118,000 people. According to 1955 statistics the urban population is 61,223, the non-farm rural population, 38,031, with 11,156 persons living on farms.[19]

Gaston County is the largest combed yarn center of the South. It has virtually two hundred textile industries or industries making textile machinery or supplies. Almost fifty-nine per cent of the people employed in the county are in manufacturing, and only about 4.5 per cent of the employed persons are engaged in agriculture. Many of those living on farms work regularly in manufacturing plants and have farming as an avocation.

In 1954, 96.5 per cent of the school-age population was in school.[20] In 1954 there were 533 teachers and principals employed in twenty-six elementary schools and nine high schools.

The enrollment and average daily attendance of the State Orthopaedic Hospital School varies from one month to

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[19] Bill Sharpe (ed.), "Gaston Facts," The State, 22:30, January, 1955.

[20] Ibid.

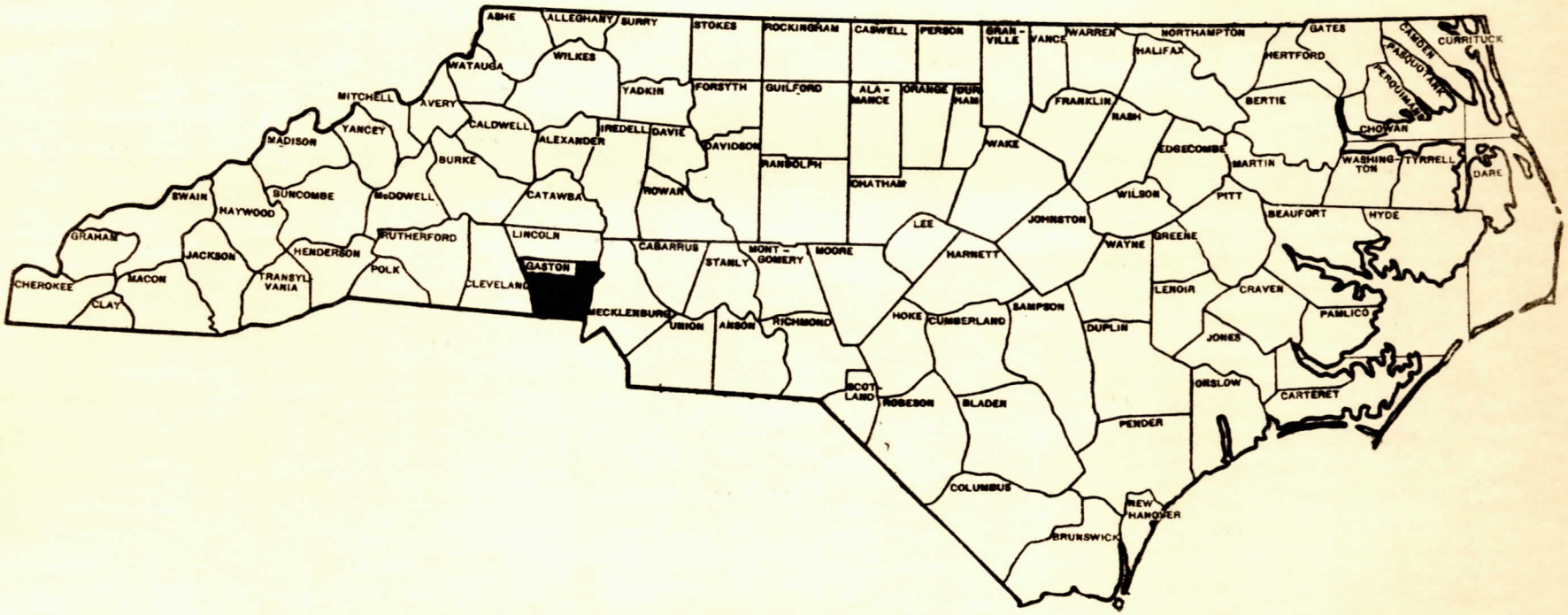

FIGURE 1

LOCATION OF GASTON COUNTY IN NORTH CAROLINA

the next. The school is in session for eleven and one-half months each year. Children are brought to the hospital for treatment. Some stay for several years, some for only a few months, and others leave after several weeks of treatment. While they are there, they attend the hospital school.

Fifty-eight school buses carried about fifteen hundred students to school daily in 1954, and there were approximately twelve and a half thousand pupils in average daily attendance in the elementary and high schools.

Figures 2 through 6 depict the number of county schools in the six townships that were included in this survey, the number of those that are in rural areas and those that are in urban communities, the average daily attendance of both elementary and high schools, and the number of students transported daily to these schools.

IV. SOURCES OF DATA AND METHODS OF INVESTIGATION

Sources of data. Part of the information for this study was obtained by questionnaires sent to the teachers in the twenty-six elementary schools and the nine high schools in 1952 and 1954.[21] The returns averaged 67 per cent. The greater number of these came from the urban schools, but the greater per cent of teachers responded

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[21] Infra, Appendix A.

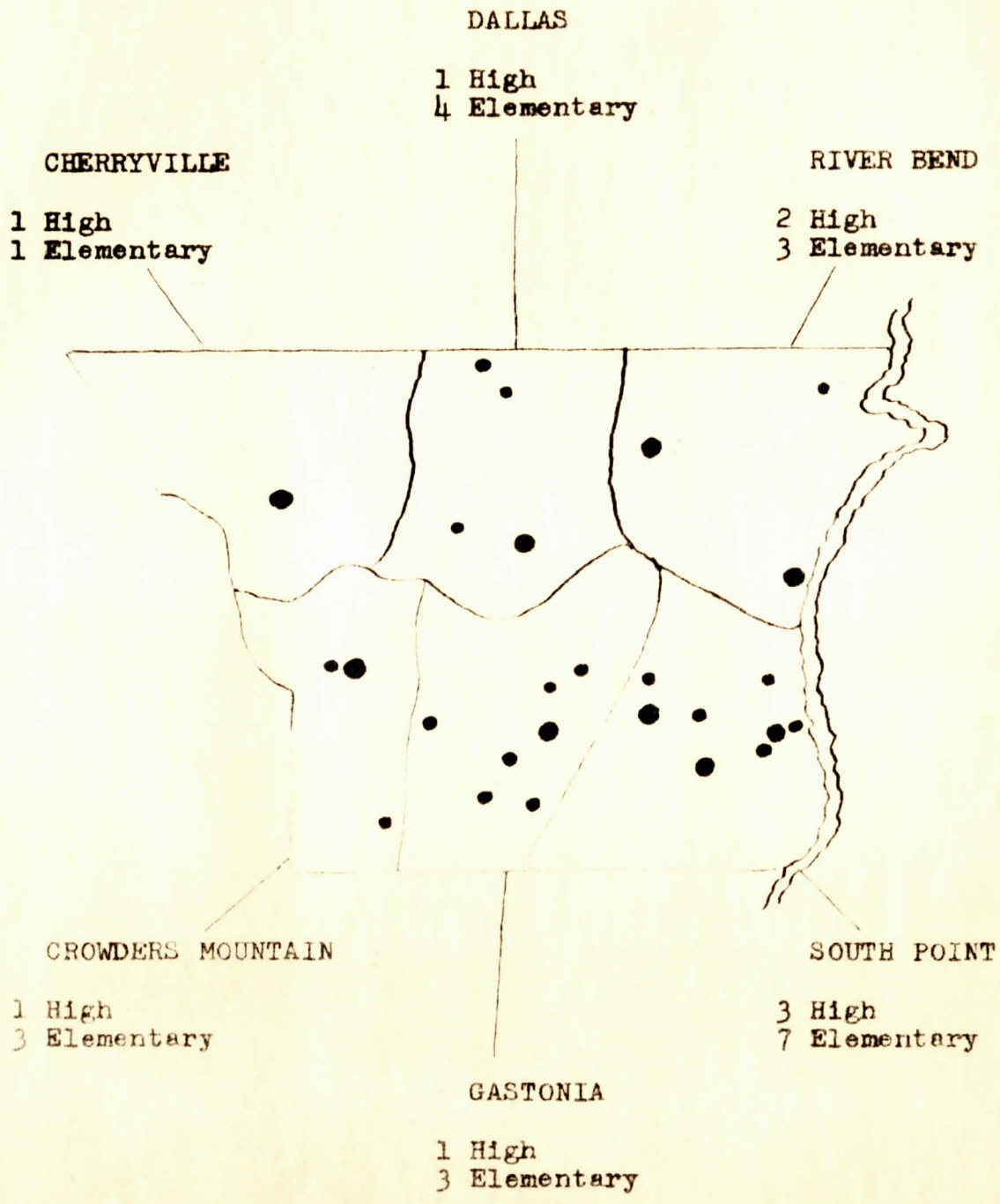

FIGURE 2

TOWNSHIPS AND LOCATION OF SCHOOLS IN GASTON COUNTY

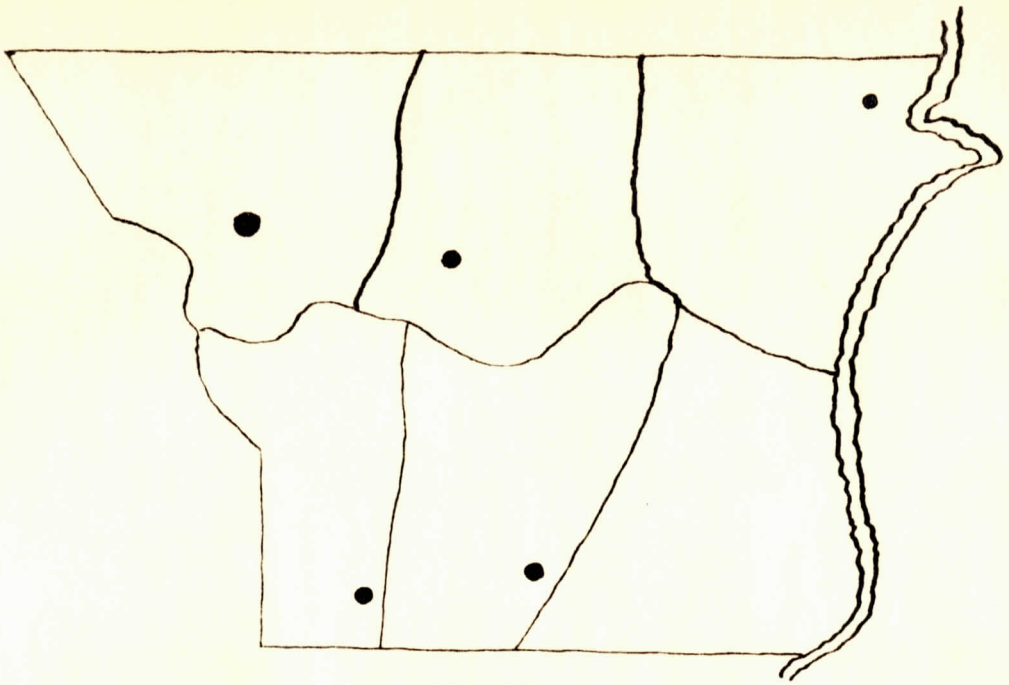

FIGURE 3

RURAL SCHOOLS IN GASTON COUNTY

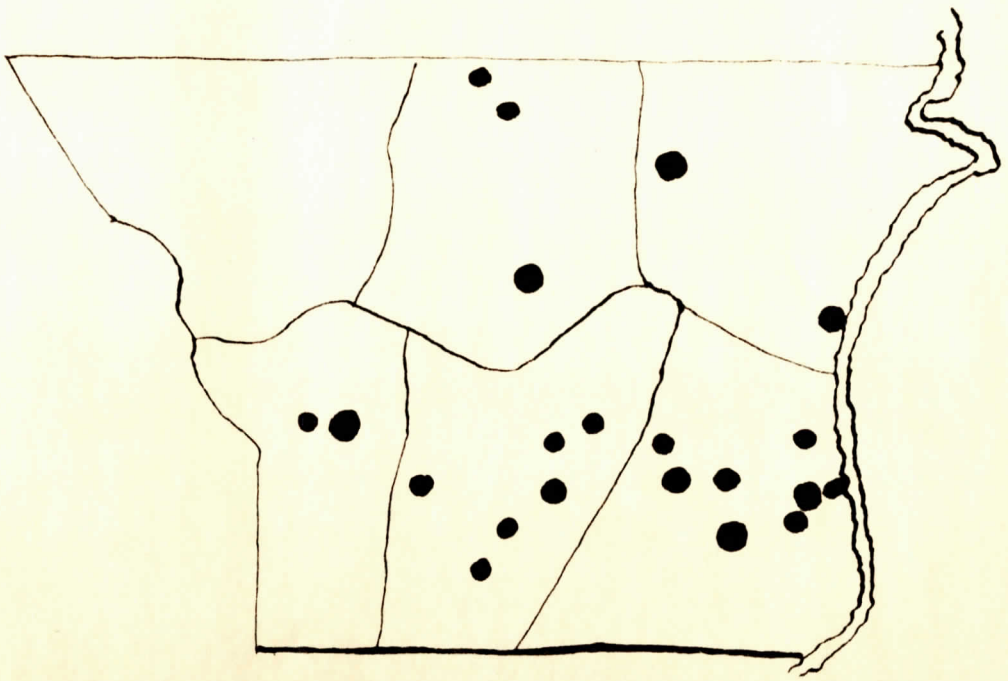

FIGURE 4

URBAN SCHOOLS IN GASTON COUNTY

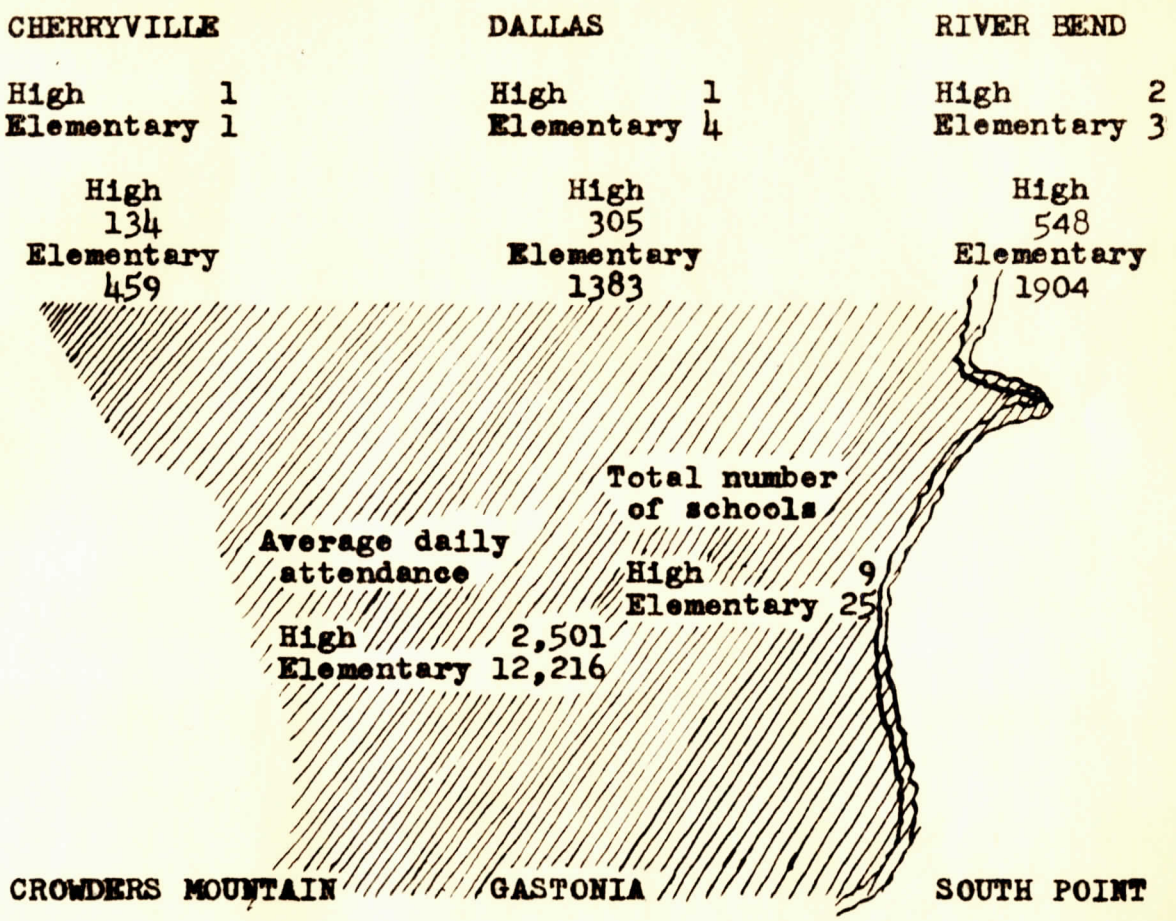

FIGURE 5

NUMBER OF SCHOOLS IN EACH TOWNSHIP AND THE AVERAGE DAILY ATTENDANCE
1954

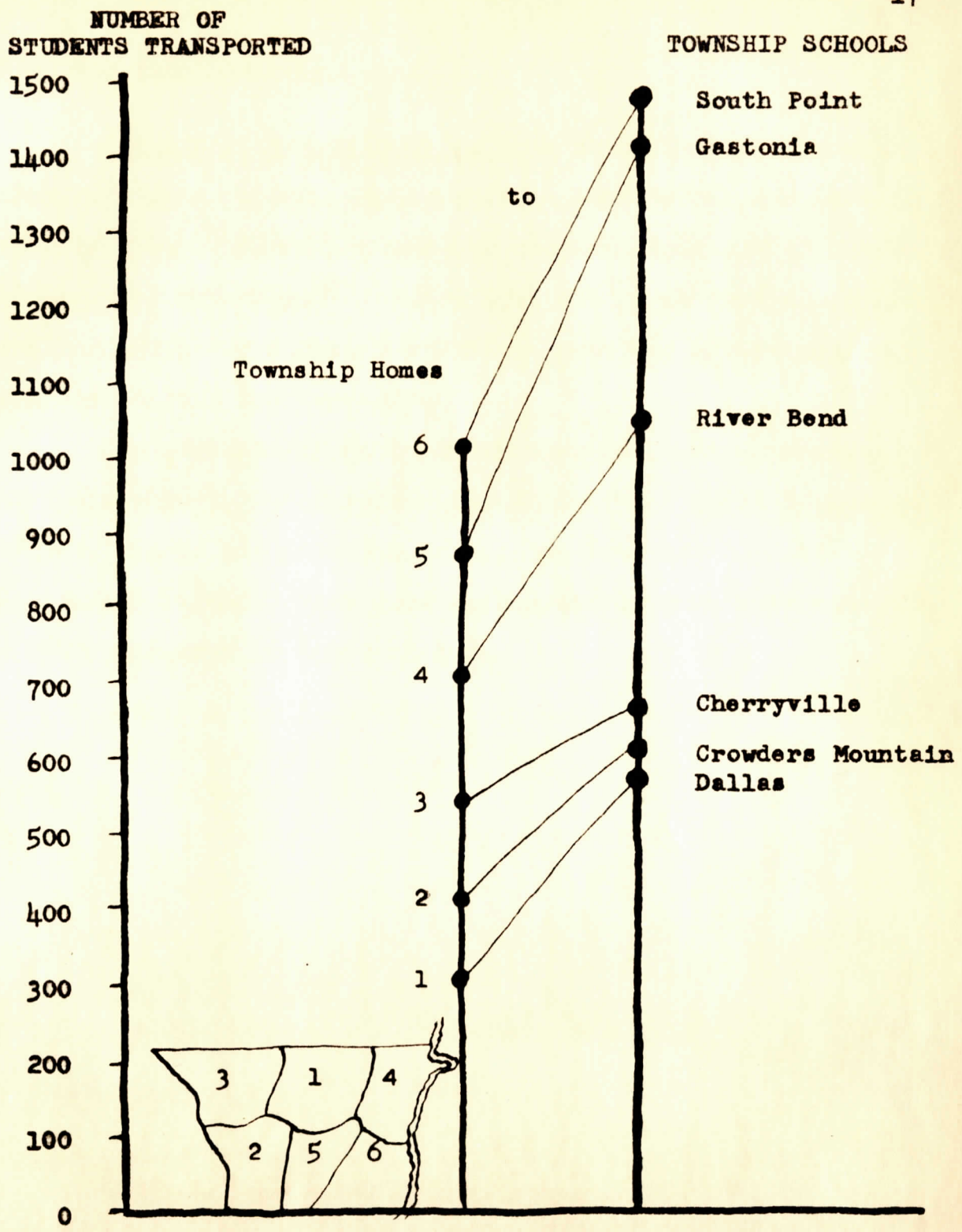

FIGURE 6

NUMBER OF GASTON COUNTY STUDENTS TRANSPORTED FROM THEIR HOMES TO THE SCHOOLS IN EACH TOWNSHIP

from the rural schools.

Methods of investigation. The investigation for this study was made through questionnaires sent to the teachers in all twenty-six elementary schools and nine high schools preceding each workshop.[22] Visits were also made to the schools and information was received through personal interviews with principals and teachers.

The questionnaires included the time, date, purpose of the workshop, and possible activities that would be included. Space was provided, also, for teachers to list activities in which they were interested if they were not already included in those listed.

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[22] Infra, Appendixes B, C, D, E, and F.

CHAPTER II

BASIC PRINCIPLES SIGNIFICANT TO ELEMENTARY SCIENCE EDUCATION

Increased interest in elementary school science. Elementary school children are very much interested in science. During the past generation progress in science has superseded that made in any other field of human endeavor, and developments in this area have had a greater influence on life in the world today than accomplishments in any other area. Science is a definite part of children's lives; their inquisitiveness about innumerable subjects is indicative of intense interest.

When children are given the opportunity to select subjects for study or for discussion, very often they mention topics in science. These may be directly related to their own experiences, or they may be topics of special interest about which they would like more information. Learning will be the result when there is interest. Children like to read about things that are of interest to them, but they learn best when the opportunity is given them to see, hear, and experiment for themselves. Such experiences enable them to gain a deeper and clearer understanding of the topics under consideration.

Sources from which scientific information is secured are varied. Children prefer reading books that are interesting,

attractive, and concise. Authors of textbooks, supplementary readers, library books, and magazines have taken this information into consideration and have published books and magazines that are in demand by young readers. Children are interested and their experiences are broadened by science programs broadcast by radio and television. A survey of this interest made in the Gaston County schools in 1952 revealed the information presented in Table I.

TABLE I*

INTEREST IN SCIENCE PROGRAMS BROADCAST
1952

Age group of children listening	RADIO PROGRAMS				TV PROGRAMS	
	WSOC Radio		Mr. Wizard		Nature Museum	
	Rural	Urban	Rural	Urban	Rural	Urban
Primary	35	251	52	533	100	801
Intermediate	127	1392	73	1594	74	1650
Junior High	111	755	37	668	71	739
High - Science				100		46
Totals	273	2398	162	2895	245	3236

*These figures represent information received from 152 of the 391 teachers in the Gaston County schools for 1952.

Another occasion when students in the schools indicated an interest in science was in December, 1952. At that time the educational representative from the Wildlife Resources Commission in Raleigh visited eighteen schools and spoke to an assemblage of students from first grade through eighth in eleven of those schools, and from first grade through the twelfth grade in each of the other seven schools. During each assembly the students appeared to be quite attentive as she spoke to them about the four renewable resources--forests, soils, water, and wildlife. After each program many students asked her to come to their classrooms and tell them more about science. During those six days she spoke to ten thousand and fifty-four students in the county.

There are other indications of an increased interest in the teaching of science in the elementary school. Yearbooks, bulletins, meetings, workshops, and other educational means are being used to help teachers improve their teaching and provide assistance in building the curriculum.[1] The new North Carolina elementary science bulletin furnishes a wealth of suggestions for an excellent science program in

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[1] Glenn O. Blough and Paul E. Blackwood, "Progress Report of Elementary School Science," School Life, 36:42-3, 47, December, 1953.

the elementary schools of the state.[2]

Sometimes children suddenly announce that they are going to be scientists. What influences prompt these decisions? The answers to a questionnaire sent to ninety-five finalists of the 1954 National Science Fair, conducted by Science Service's Science Clubs of America, may partly answer the question.[3]

These young scientists were asked who or what first interested them in science. Seventy-nine teen-age finalists answered the questions. Of the replies, 36.7 per cent stated that the schools and their teachers had aroused their interest in biology, chemistry, physics, and other sciences. The next greatest influence was the home. Some member of the family had encouraged them, they had received chemistry sets, had read magazine articles, or had read science books. Some reported that phenomena of nature had aroused interest or created so much curiosity that they wanted to know more about what was happening.[4]

In the elementary schools children become interested through the same channels and through radio and television

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[2]Julia Wetherington (ed.), Science for the Elementary School (Raleigh: State Department of Public Instruction, 1953), Publication Number 293.

[3]"Study Science Interest," Science News Letter, 67: 182, March 19, 1955.

[4]Ibid.

science programs. Resource people visiting the classrooms or talking with them during assembly programs about subjects of special interest to them are also influences in channeling children's interest.

Function of elementary science education. One of the most important functions of science education is arousing the interest of the general public in the conservation of the natural resources of our country. This includes learning more efficient methods of providing the necessities of life, preserving the beauties of nature, and diminishing the destruction of irreplaceable resources.

During the past hundred years the use of land, wildlife, forests, grasslands, and water resources has been the most destructive of any period in the history of the world. Word pictures of this violent, wholesale destruction have been painted by persons interested in the wise use of resources. Osborn[5] and Chase[6] have done much to call attention to the present situation in the world.

Re-emphasis has been placed on the importance of taking care of these valuable resources by more recent writers

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[5]Fairfield Osborn, Our Plundered Planet (Boston: Little, Brown, and Company, 1948), 217 pp.

[6]Stuart Chase, Rich Land, Poor Land--A Story of Waste in the Natural Resources of America (New York: McGraw-Hill Book Company, 1936), 217 pp.

of science books. Suggestions for carrying out successful science programs in the elementary school are offered by Blough,[7] Craig,[8] and Thurber.[9]

Three general objectives of conservation education are: (1) to give information about natural resources; (2) to develop desirable attitudes toward wise use of these; and (3) to give experience with conservation practices. Instruction in science helps meet these objectives.

People with sufficient information develop proper attitudes toward the wise use of natural resources. Much education is needed in the proper use of the beauty of the countryside. Much training can be accomplished by contrasting places that are well cared for with places that are unsightly and abused. What better place can this training be received than through science training in the schools?

The chief purpose of the elementary school is the growth and development of the whole child--intellectual, physical, social, and emotional. Science training contributes in many ways toward accomplishing results in line with

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[7]Glenn O. Blough and Albert J. Huggett, Elementary School Science and How to Teach It (New York: The Dryden Press, 1951), 84 pp.

[8]Gerald S. Craig, Science for the Elementary School Teacher (New York: Ginn and Company, 1947), 561 pp.

[9]Walter A. Thurber, Exploring Science (New York: Allyn and Bacon, Inc., 1955), 158 pp.

this purpose.[10] Muscular coordination, skill in handling tools, and familiarity with materials are developed when children have the opportunity to experiment, construct, and work with things. Often the "retarded" children can equal or excel their classmates in this type of program.

A variety of science projects gives all children in the class an opportunity for self-expression. Some may excel in constructing models, some in writing and producing plays, others in collecting and exhibiting materials, while others would be interested in painting friezes or in keeping notebooks or records of the work being done. Thus all children have the opportunity to develop their own particular talents. Variety keeps interest high and provides for individual differences.

Another very important phase of learning is the ability to plan and work together, to share responsibilities, and to assume leadership.[11] It is most rewarding to watch children use their own ingenuity and initiative in carrying out plans they have helped to formulate.

Science activities, such as experiments, field trips, and projects, lead to research in order that comparison may be made between children's observations and the information

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[10] Ibid., p. 5.

[11] Ibid., p. 6.

given by authorities. By making such comparisons children learn to be openminded, critical, and careful about forming hasty judgments.

Thus the most important result of the elementary science program is the development of citizens who understand the opportunities and problems of their community and how they can be of greater service to fellow citizens and to posterity by helping to solve these problems.

Pre-service and in-service training of teachers. Even though science is still not being taught on some grade levels, the writer finds interest in all grades. Some teachers hesitate to venture into the field of science because of lack of training in science. Among some there is a feeling of insecurity unless they use a basal textbook.

Some teachers continue to teach as they were taught, lacking knowledge in the use of simple and inexpensive materials that are valuable in a successful elementary science program. It is equally as important that they know the many resources of the community that can be used to promote learning. Many environmental materials may be collected for use in school work, while others may be had merely for the asking. Local speakers may contribute much to the enrichment of the program. The resourceful teacher makes use of both human and natural resources to make school work vital and

interesting.[12]

Education in the natural sciences should broaden the interests of teachers. They should gain information of practical importance in everyday living, which would be helpful in relating scientific findings and theories to modern civilization. They should develop the scientific attitude and use scientific techniques in the solution of problems. Academic experience, such as listening to reports, looking at pictures, diagrams, models, apparatus, and demonstrations, should be supplemented by individual experimentation and explorations in the field.[13]

The experiences of prospective teachers must make them aware of the natural environment and must give them a broader understanding of the interrelationship of plant and animal life, an interrelationship which maintains a balance in nature unless it is disturbed by man's reckless depletion of wildlife.[14] These pre-service experiences of teachers must emphasize the individual's responsibility in the wise use of natural resources.

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[12]George Peabody College for Teachers, Pre-service Education of Elementary Teachers, Report of the Teacher Education Workshop, Division of Survey and Field Studies (Nashville, Tennessee: George Peabody College for Teachers, 1944), p. 28.

[13]Ibid., p. 41.

[14]Ibid., p. 50.

Their training should give them an understanding that water affects the development of a region more than any other resource and that man is dependent upon soil for his food, clothing, and shelter. If the soils are depleted, foods lose their nutritive value, endangering the health of individuals. In order to learn from direct observation the plants and animals of the community, their interdependence upon each other, and the other natural resources, pre-teachers should experience numerous field trips.

Through pre-service and in-service training, teachers gain a broader knowledge and understanding of materials, methods, and techniques necessary for an effective instructional program. Pre-service education prepares teachers before they begin work in the classroom, and in-service training is designed especially for those already in the field who desire continuous growth in learning newer methods and techniques of instruction in order that they may make their programs of greater value to the students in their classrooms.

Continuous growth and development in the competencies required for good teaching are most important. Much of the ability to teach is gained through actual classroom experience. Thus the teacher's professional life is a continuous program of in-service education. There are innumerable opportunities for in-service education--conferences,

professional magazines, professional books, travel, college classes--but little appraisal of the various techniques has been made.

In a report of a survey of the 1950 in-service education of teachers in Oregon, about half of the teachers felt that they were not sufficiently competent in the techniques of modern teaching--the use of audio-visual materials, the use of newer reference materials, the guidance of young people; two-fifths of the teachers felt that they were not sufficiently qualified to direct the participation of pupils in planning classroom work, in the supervision of extra-curricular activities, and in working with parents.[15] Without training in improving these techniques they will remain the "traditional, textbook bound, academic teachers of subject matter."

Teachers recognize the need for help, they want it, and they ask for it. The real challenge is to the superintendents, principals, supervisors, college professors, and state department officials who plan in-service activities for teachers.[16]

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[15] Hugh B. Wood, In-service Education of Teachers--An Evaluation, Curriculum Bulletin Number 81, University of Oregon (Eugene, Oregon: The School of Education of the University of Oregon, 1950), p. 26.

[16] Ibid., p. 28.

The account of a successful in-service training program that met the needs of teachers is given by Froehlich.[17] Because they had been successful in receiving practical materials that they could carry back to their own classrooms, the teachers were happy. New knowledge had been put into practice.

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[17] Clifford P. Froehlich, "In-service Training Programs That Succeed," Clearing House, 23:259, January, 1949.

CHAPTER III

THE ELEMENTARY SCIENCE WORKSHOP

Brief history of workshops. Perhaps the first organized program of in-service training for teachers began in Connecticut in 1939 with the establishment of teachers' institutes by Henry Bernard.[1] These institutes were designed to help teachers to gain more information, to secure assistance in organizing the subject matter they were to teach, to learn something of mental processes and method of teaching, and to understand something of school organization and management.

The first reading circle was organized in Ohio in 1883. In these meetings teachers studied professional books which presented educational philosophy and practices of that day.[2]

Harvard University was the first to organize summer school as a means of educating in-service teachers. Immediately afterward, the Universities of Wisconsin, Indiana, and Chicago began summer schools for teachers.[3]

In 1914 the United States Office of Education sponsored

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[1] Leander L. Boykin, "Evolution of Teachers' Workshops," Journal of Teacher Education, 5:191, September, 1954.

[2] Ibid.

[3] Ibid.

a nationwide conference at Chicago to study the problem of training and supplying teachers for rural schools. In 1915 another conference was held in Nashville, Tennessee, to formulate a plan by which thousands of rural school vacancies could be filled. The vacancies occurred as a result of the migration of a great number of teachers to more attractive positions in the cities and towns. Special courses were organized in normal schools, county-training schools, and high schools for training rural teachers.[4]

Resulting from the efforts of teachers already in the profession to utilize every means of helping themselves become more efficient leaders in the rural communities and better teachers in the classrooms, the National Rural Teachers' Reading Circle was organized at the National Education Association meeting at St. Paul, Minnesota, in 1914.

As the interests of teachers' associations became more concerned with the welfare of teachers and pupils than with improvement of teaching methods, teachers' conferences became a definite part of the in-service educational program. These were called "work conferences," instructional conferences," and "orientation conferences."

The more recent and widely used term for in-service education of teachers is "workshop," which was first used

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[4] Ibid.

about 1936, even though similar methods were used much earlier.

Various terms have been used to denote methods of in-service training. The lecture method was followed by the "practica" study method, which emphasized the practical study of the themes. Then came seminars, curriculum laboratories, activity schools, and finally the workshop.[5]

The workshop has been accepted widely as a means for in-service training of teachers. This term has been used to refer to all types of meetings, but the true "workshop" is the type of experience where actual participation by all is achieved. It is one in which all the activities of the participants are included in the plans. They plan, work, eat, and play together. They attend lectures and conferences, talk and plan with consultants, share ideas with each other, and participate in activities meant to enrich their teaching in the classroom.

Workshops are especially planned for teachers who have already had experience in the classroom. Attendance at workshops is not encouraged in order that teachers may gain knowledge alone, but rather that they may learn how to apply the knowledge already gained in a more interesting and successful way.

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[5] Ibid.

Characteristics of the workshop. Committee work is essential to the success of a workshop.[6] Committees are usually chosen for planning, social, library, visitors, hospitality, publicity, publications, bulletin board, decorations, and evaluation.

Evaluation is a most important phase of the workshop. Every individual, whether consultant or participant, should make a critical evaluation of his own activities and those of the group.[7]

Social interchange is of great value to those participating.[8] Provision for social activities should be included in the preliminary plans for the workshop.

Principles of learning taken into consideration in the well-planned and well-directed workshop are readiness, a felt need, democratic procedure, group process and activity, practical materials with which to work, cooperative work, individual and group participation, social growth, and problem solving.

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[6]Leander L. Boykin, "What Is A Workshop?" Progressive Education, 32:5, January, 1955.

[7]Frank S. Allen, "The Workshop: Does It Deliver?" Bulletin of the National Association of Secondary School Principals, 34:228, December, 1950.

[8]Kimball Wiles, Supervision for Better Schools (New York: Prentice Hall, Inc., 1950), p. 167.

Perhaps no other technique is as valuable for improving human relations, for practicing democratic procedure, for cultivating friendships, for minimizing prejudices, for changing attitudes, for improving teaching methods, and for growth professionally and personally.[9]

Perhaps this is the channel through which teachers and administrators will find ways of developing a deeper sense of security in the feeling that they are making a direct contribution to improvement of conditions in the school and community and to the promotion of better living, learning, and developmental conditions for boys and girls.

The proof of the value of workshops is in what happens after the workshop is over. Changes made in the instructional programs and the achievement of more adequate developments in children are tests of the success of the workshop.

The workshop is more successful as a summer activity because time is needed to work through the problems fully, and then teachers are free from their school responsibilities. They can concentrate fully upon their problems and other activities.

What teachers want in workshops in elementary science. At the summer session of the University of Southern California

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[9]Walter A. Anderson, "What Makes A Good Workshop?" Journal of Educational Sociology, 24:251, January, 1951.

thirty-nine in-service elementary teachers spent several periods planning overall goals to be achieved by the group as well as specific individual goals. Each teacher worked on her own problem and also belonged to a group which had common interests. Reports were made by each group and by each individual teacher.

Consultants were the instructor and an assistant. A study was made of the local flora, the water supply, the physical environment, and other topics in which interest was indicated. Field trips were taken to the county museum, to a forest experiment station, and to a demonstration school. Resource people and films were also used in the study of various subjects.

After the workshop was finished, a complete evaluation of all activities was made. These were some of the questions asked, and the answers that the participants gave:

WHAT ABOUT THE WORKSHOP HAS BEEN OF MOST VALUE TO YOU?

1. The wealth of materials with which to work.
2. The opportunity for free exchange of ideas.
3. The opportunity to share problems, ideas, and interests with others.
4. Quickened interest in science.
5. Respect for opinions and ideas of the students as well as the instructor.
6. Complete cooperation between students and instructor.
7. Enthusiastic instructor.
8. Opportunity to work on projects suited to individual needs.
9. Experienced success in right and wrong procedures.
10. Adopted and practiced the scientific method.
11. Better able to understand the interests, abilities, and capacities of my own children.

12. Learned many simple experiments that can be used in the classroom.
13. Confidence gained from practice.
14. The ability to take discarded materials and use them successfully in demonstrating science principles.

IN WHAT RESPECT HAS THE WORKSHOP FAILED TO MEET YOUR NEEDS?

1. Workshop fulfilled its purpose.
2. Too much covered in a short period.
3. Scientific explanations too complex for elementary children.
4. Personal foundation in science was too meager.
5. Lack of a clear understanding of the workshop approach.

HOW DOES YOUR EFFORT IN THIS WORKSHOP COMPARE WITH THAT IN OTHER THREE CREDIT GRADUATE COURSES?

1. 26 answered moreeffort and 13 said about the same.

HOW DOES YOUR GAIN IN THIS WORKSHOP COMPARE WITH OTHER THREE CREDIT GRADUATE COURSES?

1. 36 answered more and 3 said about the same.

WHAT IF ANY UNIQUE GAIN HAS COME TO YOU FROM THIS WORKSHOP EXPERIENCE?

1. Opportunity to work with others and exchange ideas.
2. Actual participation in planning a workshop program.
3. Encouraged to do a better job of teaching elementary science.
4. Instructor able to put science on the level of the elementary school child.
5. Learned more in this workshop than in any class ever taken.
6. Learned to like elementary school science.
7. Realized that graduate work can be creative and pleasurable.
8. Better able to think critically and analytically.
9. Gained a better knowledge of scientific methods, procedures and ways of presenting science to first grade children.
10. Realized the vast field of science suitable for elementary school children.
11. Gained a knowledge of the great store of science materials in the simple things in the environment.
12. Gained a better picture of the entire science program.

13. Realized that the science program can be a foundation from which other subjects evolve.
14. Gained confidence in my ability to demonstrate before a group.

IF YOU HAD IT TO DO OVER AGAIN WOULD YOU ENROLL IN THIS COURSE?

1. All 29 students answered in the affirmative.

WOULD YOU RECOMMEND THIS WORKSHOP TO OTHERS?

1. 38 students said yes, and 1 said no.

SUGGEST WAYS IN WHICH A WORKSHOP CAN BE MADE MORE EFFECTIVE.

1. More orientation and direction for those unfamiliar with subject and techniques.
2. Closer check on individual participation.
3. Limit discussion and demonstration time to all.
4. Change group chairman frequently.
5. More attention to individual problems.[10]

It may be noticed from the evaluation of this workshop that a high level of stimulation and growth resulted from the freedom to work with other teachers who shared the same interests and problems and to interchange ideas with them. Greater achievement resulted from having the work organized to meet the individual needs of the students. Materials were developed for use in the individual's teaching situation. Many experiments and demonstrations were centered in the development of understandings, concepts, and appreciations. Although the workshop failed to meet

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[10]Eldred N. Bingham, "What Elementary Teachers Want in Workshops in Elementary Science," Science Education, 39: 59-64, February, 1955.

the needs of some teachers, to the great majority it was the most profitable course they had ever taken. Some seemed to be frustrated by the lack of time, realizing that the use of the scientific method yielded more satisfying results. In general, teachers gained a broader insight as to the role of science in the elementary school.

Some of the activities most valued by the members of the class were experiments, demonstrations by the faculty, workshop demonstrations, discussion, work with various kinds of materials, sharing ideas with others, construction of demonstration apparatus, and individual projects.[11]

They also recognized the value of community resources and the extent to which they could be used successfully in classroom experiences.

This statement was made relative to the successful use made of the suggestions offered as an evaluation of this workshop: "I have had an opportunity to incorporate many of these suggestions in workshops since this evaluation was made and find additional support for them. It is my firm conviction that every in-service elementary teacher should have a workshop experience like the one outlined herein."[12]

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[11] Ibid., p. 64.

[12] Ibid.

CHAPTER IV

GASTON COUNTY WORKSHOPS

Increased interest in elementary school science became more evident in 1951 among both teachers and students in the Gaston County schools than had been manifested in previous years. Perhaps a part of this interest might have been attributed to weekly science broadcasts in which children were very much interested. Further interest might also have been ascribed to the advance of science in many fields of endeavor that had their inception during or following World War II. The interest was there, however, regardless of the cause.

Although new and more beautifully illustrated books were being added in the supplementary reading field and in the libraries, the teachers felt a need for practice in newer methods and techniques for making science in the classroom more interesting and of greater benefit to the students.

In September, 1952, at the meeting of the Planning and Resources Committee of the local organization of the North Carolina Education Association, the chairman stated that he had received a number of requests from teachers for a weekend camping trip to Camp York at Kings Mountain, South Carolina, to participate in science activities as well as to

enjoy the camping. This request was given special consideration by the committee and preliminary plans were made for this camping trip. The committee met again within a few days and completed the plans, and the program for the workshop, and the date was set for the third weekend in October.

Materials used in pre-planning workshops. Many different kinds of materials from a number of sources were used in the workshops held in Gaston County during the past five years.

Soils, leaves, seed pods, plants for terrariums and aquariums, plants for use in experiments, rocks, and many similar materials were secured from nature.

Chemicals, plastic, thermometers, candles, and bias tape were bought at the drug store or dime store.

The biological supply company, the ceramic shop, and the hobby shop were sources for other materials.

Some things were brought from homes, others secured at the lumber plant and the hardware store.

Scraps of lumber, wire, cans, and other containers, were salvaged from discarded materials at homes and at places of business.

Films and filmstrips came from dealers in these supplies. Various companies were sources for maps, globes, projectors, science kits, and other audio-visual materials.

The home demonstration center, the telephone company, the Southern Power Company, and the Wildlife Resources Commission furnished supplies and equipment for use in various activities at the workshops.

Most of the articles or items used in experiments at the workshops were contributed by teachers, by proprietors of businesses, or by persons in the various communities who were interested in the schools of the county.

Representatives from interested companies brought equipment and the materials that they wanted to work with when they came.

Teachers who wanted to work on projects for use in their own classrooms brought the materials they would need.

Some things had to be purchased by leaders or the directors of the workshop. These persons were reimbursed by those wanting the materials for use in specific activities in which they were interested.

Camp York Workshop. Preliminary announcements and copies of the program of activities were sent to every school in the county.[1] Those persons planning to attend the workshop were asked to send their replies to the chairman of the planning committee in order that the number planning to

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[1] Infra, Appendix B, 176-178.

attend could be known before final preparations were made. Replies to the questionnaire were tabulated and are presented in Appendix B.

On October 18 thirty-seven teachers from thirteen of the county schools and eight additional persons met at Camp York for a weekend of camping and science activities.[2]

Leaders of the various projects and those responsible for setting the camp in order arrived early Saturday morning. Others began arriving soon, and by ten o'clock the program of activities was underway.

Various projects were engaged in on Saturday. Pin trays and other small articles were made of ceramic clay; patterns for some of these handicraft pieces were large leaves from various kinds of trees. Seed pods from trees and shrubs were painted with enamel paint of different colors and made into decorations for use in classrooms. Artificial flowers were made and arranged into corsages. Electric naming boards were on exhibit, and directions for making them were taken by several teachers who planned to have children in their classrooms make similar ones. Simplified oil paintings were made by two of the participants.

For an hour before lunch those present had the opportunity to visit with each other and share ideas. This hour

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[2] Infra, Appendix B, p. 178.

proved to be a most profitable and interesting period. Teachers from the different schools learned to know one another and talked about common problems.

The afternoon session was devoted to nature hikes by those who were especially interested. Although the program had hikes listed as alternate activities during the morning session, everyone became interested in other projects and decided to postpone hikes until afternoon.

Another free session was enjoyed by everyone prior to the evening meal. This was another opportunity for visiting and exchanging ideas.

An educational representative from the Wildlife Resources Commission in Raleigh showed the film, "Wildlife in North Carolina," during the evening session. After the showing of the film a social hour was enjoyed. Those spending the weekend retired to their cabins before midnight. Attendance figures for the workshop are shown in Table II.

TABLE II

ATTENDANCE AT CAMP YORK WORKSHOP

Schools represented	Personnel attending	
13 urban	Teachers: Primary	12
	Intermediate	10
	Junior High	12
	High School	3
	Principals	2
	Adults other than teachers	3
	Children	3
Total attendance		45

The Camp York Workshop was received so well that there were requests for a full week of science activities to be held the next year. Plans were begun immediately to determine the number of teachers who would be interested in a science workshop prior to the opening of school the next fall. Letters were sent to all the schools mentioning the possibility of having such a workshop, and the response was most gratifying.

A questionnaire[3] was sent to every teacher, listing activities that had been suggested by teachers as they had been interviewed personally. They were also asked to list any desired activities which were not already listed. A complete list of these activities was prepared and sent to each teacher in the county in order to determine the number of persons expected in each class. The results of this survey were tabulated and are presented in Appendix C, page 182.

Leaders for these activities were then selected.[4] Prospects were contacted by telephone, letters, and personal interviews. With the exception of two persons who were helping plan a pre-school workshop of another type in which they were to participate, everyone accepted leadership of the

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[3] Infra, Appendix C, p. 180.

[4] Infra, Appendix C, p. 184.

activity for which he was approached.

Many activities were suggested, and the teachers asked that every one be included in the program if possible. Much time and effort were spent in preparing the program so that every teacher would have the opportunity to attend every class in which he was interested. After the program was completed, copies were mailed to all the teachers.[5]

Belmont Workshop. The week preceding the opening of school in the fall of 1953 was devoted to science activities from eight o'clock in the morning until five o'clock in the afternoon. Not only teachers from Gaston County attended, but there were some from Lincolnton, Charlotte, Creedmore, Kings Mountain, Durham, Pelham, Gastonia, Rockingham, Concord, and Ellerbe.

"Learning can be fun!" was the consensus of opinion among the teachers who attended this workshop. The request had come from teachers in the county in order that they might have an opportunity to participate in activities that would make school work more interesting, that they might become better acquainted with teachers in other schools of the county, and that they might share ideas with each other.

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[5] Infra, Appendix C, p. 183.

They wanted to find more interesting methods and techniques for teaching the basic school subjects so that the children's experiences would be greatly enriched and to find ways of correlating science with other school subjects without having to crowd it in as a separate subject into an already overcrowded curriculum.

There was much interest in all of the activities. The program had been planned with the thought that teachers would attend only the classes for which they had expressed preference. Interest and enthusiasm were so great, however, that a great number of them attempted to attend every session. Others expressed regret that they could not attend every class. Three hundred individuals came to the workshop, and, according to the records kept in each class, more than seven hundred persons participated in all of the activities. This number was apportioned in the manner given below in Table III.

TABLE III

NUMBER PARTICIPATING IN THE DIFFERENT ACTIVITIES AT THE BELMONT WORKSHOP

Activity	Number participating	
	Participants	Leaders
Leathercraft	5	2
Electric naming boards	5	2
Model volcano	9	1
Conservation	13	1
Audio-visual techniques	20	1
Shellcraft and coppercraft	20	2
Basketry	22	2
Rug making	26	1
Preserving specimens in plastic	29	2
Metalcraft	29	2
Guidance	34	1
Etching glassware	35	1
Ceramics	40	8
Science kit demonstration	41	1
Lamps made of inexpensive materials	48	3
Making social studies more interesting	62	1
Primary science	74	1
Primary sharing group	98	3
Grammar grade science	96	1
Total	706	36

Many beautiful handicraft pieces were made in the various classes of the workshop. In the picture shown below the ceramics instructor is calling the attention of two junior high school teachers to certain points to observe in the formation of an article made from ceramic clay.

BELMONT WORKSHOP CERAMICS CLASS

Teachers were interested in making social studies more interesting as was evidenced by the attendance at the meeting pictured below. Numerous requests have come from teachers each year asking for help in this field, and in the Belmont Workshop the state supervisor discussed with them various ways by which favorable results could be accomplished.

BELMONT WORKSHOP SOCIAL STUDIES MEETING

The primary teachers entered into their sharing meeting with much enthusiasm. Because many more teachers came than had been anticipated, the room to which they had been assigned was too small. All their activities, however, were not in this one room. After the preliminary part of their program they were free to go into a larger room, where a wealth of materials for making primary teaching more interesting and effective was on display. Here they were free to mingle with others, share ideas, and review newer materials for use in their classrooms.

BELMONT WORKSHOP PRIMARY TEACHERS' SHARING MEETING

After the workshop was over and school had begun, a questionnaire[6] was sent to all the teachers who had attended the Belmont Workshop, asking for an evaluation of the workshop experience. They were asked to list the activities that were most helpful, activities not included which perhaps would have been of greater value, and ways by which the workshop could be improved. Honest opinions were requested. The number of schools and teachers responding to the questionnaire is given in Table IV. This table is followed by some of the responses given by the participants in the workshop to the questions asked on the evaluation questionnaire.

TABLE IV

RESPONSE TO BELMONT WORKSHOP EVALUATION QUESTIONNAIRE

No. of schools in county	No. of schools responding	Per cent of response	No. of teachers attending	No. of teachers responding	Per cent of response
25	19	76	248	118	48

DID YOU ATTEND THE WORKSHOP? Of the teachers responding, 118 answered in the affirmative and 130 answered negatively.

[6] Infra, Appendix C, p. 185.

WAS THE WORKSHOP OF VALUE TO YOU?

Grade	Yes	No	Comments
1			
		1	Not a great deal.
	3		Received many new ideas I can use directly in my teaching.
	3		Enjoyed exchange of ideas as well as feeling of fellowship.
	3		Sharing meeting was most helpful.
	2		Ideas were very valuable and practical for use in the classroom.
	3		Very inspirational, informative, well-organized, and the speakers were wonderful.
	3		Saw some of the latest teaching aids whichhave already been of benefit to me.
	1		It was a help for me in planning work for this year.
2			
		1	Very little. Some of the work was too difficult for primary grades.
	2		I liked the group sharing idea. It was wonderful. It stimulated new ideas in various activities.
	4		Received many new ideas. Science program was wonderful.
	7		It was inspirational, was well-planned, and well-organized. The speakers were wonderful.
3			
		1	Very little. Most of the activities were too hard for primary children. More demonstrations should have been given.
	1		It helped me to solve some of my problems. I'm expecting to use many of the things I learned in my work this year.
	2		It was very valuable. The science sessions and the sharing meetings were very helpful.
	1		I received many helpful suggestions.
	3		It was inspirational, informative, well-organized, and most helpful to me.

Grade	Yes	No	
4			
	1		This workshop was a good example of what can be done for in-service teachers. It was wonderful.
	2		It gave me new ideas, new concepts, and a wonderful opportunity to reap helpful suggestions.
5			
	4		Gave me information that will be of great value to me in my classroom.
	2		Helped to clarify ideas on methods.
	2		I received many new ideas in science and art.
	2		The demonstrations in science were wonderful.
	7		Inspirational and practical. Added "spice" to every school who had representatives there. Already of great value. Please continue.
6			
	6		It was very, very good. Was inspirational, informative, well-organized, and most practical. I learned to "think and do things." The sharing meeting was most helpful. The spirit in which the teachers attended and helped each other was remarkable.
	1		It was more interesting and helpful than any other class I have attended.
	2		Received many new ideas and learned many new experiments. Learned how to find practical and inexpensive materials to work with.
	1		It helped me so very much in my planning for this year.
		1	I attended one session and it was too hard for sixth grade students.

Grade	Yes	No	
7			
	3		I received many new ideas that will enrich my program, especially in science, social studies, and handicraft.
	7		It was inspirational, informative, well-organized, and the leaders were wonderful.
		1	Of no value to me in teaching.
	1		It gave me a broader view of work being done in Gaston County, many pleasant hours with "fellow workers," ideas of ways by which the regular curriculum may be enriched, greater appreciation of science in the elementary school, an appreciation of the fact that other schools have some of the same problems as we, the need for guidance of each individual, creation of a stronger feeling that children should be taught more than subject matter, and help in providing methods of caring for individual differences.
8			
	6		It was very inspirational, informative, well-organized, and most practical. Leaders of the activities were exceptionally good.
	2		It was very good indeed; I learned many new, practical ideas.
	1		Very good. I learned many new skills.
Principals			Yes. The science was exceptionally good. The entire workshop was most successful. Continue the good work.
High School Home Economics			
	3		Learned more about various activities for students. Demonstrations were very good, and the sharing meetings were most helpful. Very inspirational and informative.

Grade	Yes	No	
High School Science			
	2		It was well-organized, inspirational, informative, and the speakers were very, very good.
	2		Learned new ideas for improving instruction. Learned how to embed specimens in plastic.

WHAT SUGGESTIONS HAVE YOU FOR IMPROVING THE WORKSHOP?

Grade	Number making suggestion	Suggestion
1	1	Have something more economical and more simple.
	1	Have classes from 8:00 to 12:00 a.m. and after 5:00 p.m. Concentrate on two or three subjects in an evening. Have free classes in arts and crafts.
	1	More demonstrations and actual lessons taught.
	1	Rotate schools in which workshop is held.
2	1	Have handicraft for primary grades.
	1	Program was too full for those trying to do everything.
	1	Find a more comfortable place for meeting.
	1	Have a workshop in reading.
3	1	More practical ideas for handwork for primary grades.
	3	Demonstrations of actual teaching.
	1	More science program activities in the morning.
	1	Plan to eliminate conflict in schedule of activities interested in.
	1	More comfortable place in which to work.
	1	More of the same kinds of activities.

Grade	Number making suggestion	Suggestion
4	1	The workshop idea is fine. It can help the school program as well as the individual teachers.
	1	More practical examples of projects that can be carried on in the classroom.
	1	More comfortable place and more room in which to work.
5	1	The workshop was well-planned, the activities were interesting and most helpful, and I have no major suggestions for improvement to offer.
	1	Too strenuous--too many activities in one day.
6	1	Would like to have a more practical course in science.
	1	It was fine as it was.
	1	Have shorter hours for only two or three days.
	1	Continue workshop for two weeks instead of one.
	1	More specific directions for social studies.
	1	Broader view of work being done in Gaston County Schools. More practical ideas for improving instruction and curriculum. Stress the need for teaching more than subject matter.
7	1	Many more activities similar to the ones offered and more of the same ones.
	2	Have different days for primary and grammar grades.
	2	Have shorter hours and fewer work days.
	1	Various classroom exhibits demonstrating what has been and what can be done under some circumstances.

Grade	Number making suggestion	Suggestion
7	1	Add more actual demonstrations of inexpensive class activities.
	2	Cover more subjects.
	2	Have all work, as nearly as possible, in the same building, especially on the same level.
	1	Have workshop nearer the center of county.
	1	More definite schedule and directions.
	1	More time for teachers to discuss their personal problems.

WHEN WOULD YOU PREFER HAVING THE WORKSHOP?

Anytime	1
First week in August	47
Last week in August	127
Early fall	11
Early summer	34
After school begins	40

WHAT ACTIVITIES WOULD YOU LIKE TO HAVE INCLUDED?

Activity	Number of requests
More science	63
Creative art	42
Audio-visual	10
Field trips	55
Music	67
Games, rhythms, physical education	48

The workshop at Belmont appeared to be quite successful because of the interest and enthusiasm of the leaders and the teachers who participated in the various activities. Interest in this type of in-service training was so great that requests came for another workshop to be held, in which only science would be stressed. Many requests came for a workshop to be held after school began in the fall for those who could not attend during the summer months.

After school began in the fall of 1953, a questionnaire[7] was sent to all the schools in the county, stating that a workshop would be held the third week in November if a sufficient number of teachers were interested. A tentative program of activities[8] for which teachers had made request in their evaluation of the Belmont Workshop was included in the announcement.

At the summer workshop the grammar grade teachers had decided to postpone their sharing meeting until later, since they were tired after a week of activities and since the weather had become almost unbearably hot. They decided to have their meeting on Tuesday, November 17, 1953.

When the list of teachers from each school who were planning to attend the fall workshop was counted, there were

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[7] Infra, Appendix D, p. 187.

[8] Infra, Appendix D, p. 189.

256 who were interested and several more who planned to come if possible.[9]

Bessemer City Workshop. An afternoon session was scheduled from 3:40 until 5:30 for audio-visual techniques, music, and alternate classes of physical education. The evening sessions, from 7:00 until 9:00, were for choral reading, creative drama, and physical education. The complete program of activities is found in Appendix D, page 190.

An interested and enthusiastic group of teachers attended each session. Virtually the same ones were there during the entire four-day period. Attendance figures for each day are given in Table V.

TABLE V

DAILY ATTENDANCE AT THE BESSEMER CITY WORKSHOP

Monday	Tuesday	Wednesday	Thursday
299	243	284	294

Leaders for the various activities participated in during the Bessemer City Workshop are given in Table VI.

[9] Infra, Appendix D, p. 188.

TABLE VI

LEADERS OF WORKSHOP ACTIVITIES

Activity	Leader
Audio-visual techniques	Two eighth grade teachers College audio-visual director
Physical education	Recreational director Physical education director
Choral reading	Member of Little Theater and bookkeeper at bank
Dramatics	High school English teacher and dramatics instructor
Music leader	County supervisor
Grammar grade sharing group	Eighth grade teacher
High school science group	High school science instructor
Commercial teachers meeting	High school commercial teacher

The grammar grade teachers' sharing meeting was held in the gymnasium from four o'clock until five-thirty p.m. on Tuesday afternoon. Twelve teachers from the county schools were present to tell something of the materials on display from their classrooms. These were materials that the students had helped plan and prepare for display in their schools. The day before the workshop began, one eighth grade teacher who had planned to have materials on display

at the meeting found that it would be impossible for her to attend. Three of her eighth grade students volunteered to present the explanation of their project to the teachers at the meeting.[10]

Each class had an opportunity for recreation every evening, and on the last night all joined in square dancing. Thus ended the third workshop, one which had been well attended and apparently enjoyed by a large number of teachers.

At the supervisors' meeting in the fall of 1953 a report of the workshops that had been held in Gaston County was given, and several district supervisors asked if they could be included in the next one. They were given the assurance that they would be most welcome to share the experiences with the Gaston County teachers. Some of them had participated in the workshop at Belmont and had made a valuable contribution there.

Before schools closed in the spring of 1954, plans were begun for the science workshop that would be held the week preceding the opening of school that fall.

Letters were sent out as they had been previously to determine the number of teachers planning to attend.[11] Copies were also sent to supervisors in surrounding counties who

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[10]Materials on display at the Bessemer City Workshop are listed in Appendix D, p. 191.

[11]<u>Infra</u>, Appendix E, p. 193.

had expressed an interest in attending. Final plans and the program were completed during the summer months, and copies were mailed to all who had expressed an interest in attending.[12]

Peedin School Science Workshop. The elementary school science workshop held at Peedin School in Gastonia was well attended by a great number of interested and enthusiastic teachers. Even though the weather was unusually hot, every session was well attended. Everyone commuted to the meeting place each day. Many lived twenty miles from Gastonia, and a group from Albemarle were sixty miles away, but they came each day. Teachers from five counties other than Gaston County attended. Figure 7, page 64, shows the attendance by counties.

Attendance figures for the workshop by departments are shown in Table VII.

TABLE VII

PEEDIN SCHOOL SCIENCE WORKSHOP
ATTENDANCE BY DEPARTMENTS

Department	Number
Primary	117
Intermediate	95
Junior High	41
High School	3
Principals	4
Supervisors	9
Others	7
Total individual attendance during workshop	276

[12] Infra, Appendix E, pp. 195-198.

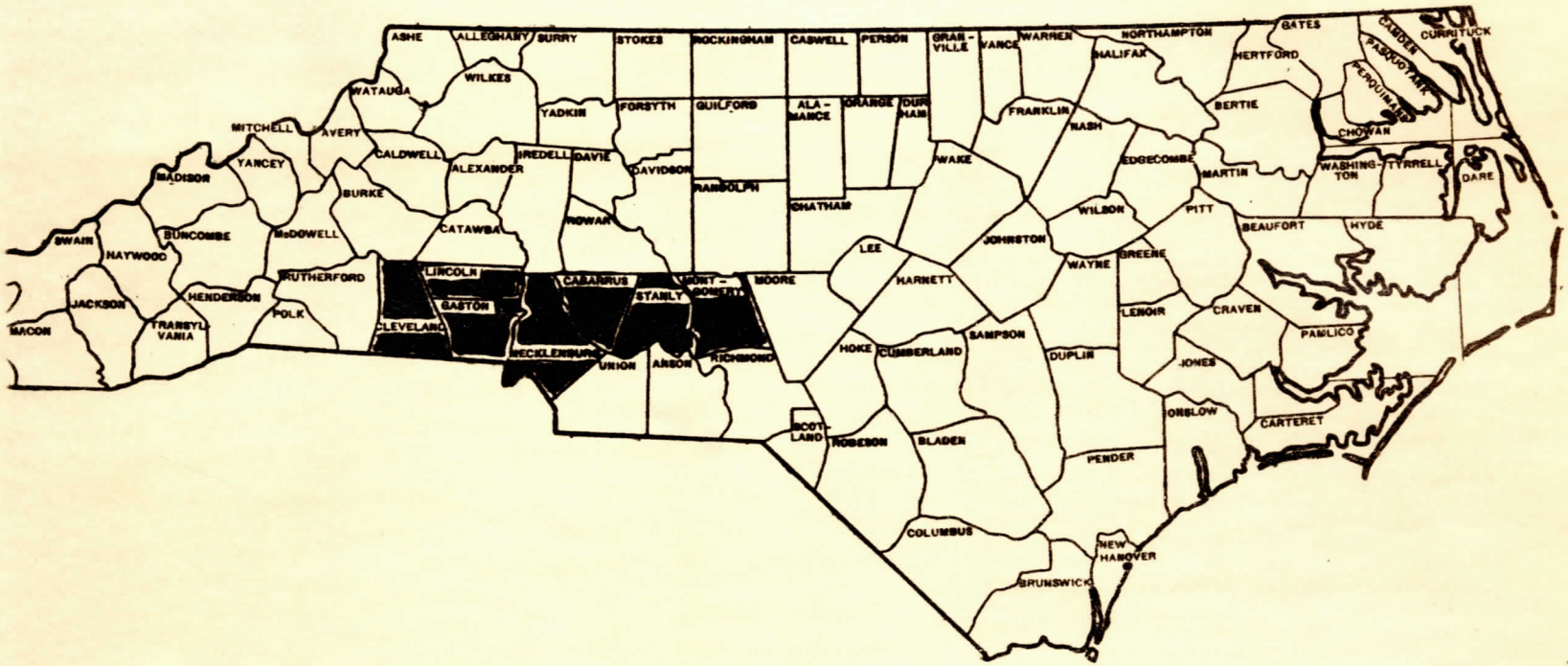

FIGURE 7

COUNTIES FROM WHICH TEACHERS CAME TO THE
PEEDIN SCHOOL SCIENCE WORKSHOP

Daily attendance figures for the various counties and cities represented at the Peedin School Science Workshop, as well as total daily attendance figures are given in Table VIII, page 66.

The teachers who attended this workshop utilized the opportunity to construct materials they could use in their own classrooms.

Emphasis was placed on the use of the globe in developing basic concepts for primary and intermediate grades. Demonstrations were given to help those present to visualize how day and night, the length of day, and the seasons may be illustrated to children by the use of such materials as clay, small flags, a flashlight, et cetera.

Concepts relating to magnetism were developed in relation to children's experiences. To illustrate the use of magnets, several experiments were conducted.

All the materials needed for constructing terrariums were placed on a table at the front of the room, and volunteers were asked to help construct one as a demonstration.

Each step in the building of a balanced aquarium was also demonstrated, and practical suggestions were developed relative to maintenance and care of both terrariums and aquariums.

TABLE VIII

PEEDIN SCHOOL SCIENCE WORKSHOP
DAILY ATTENDANCE FIGURES

Place represented	Daily Attendance					
	Monday	Tuesday	Wednesday	Thursday	Friday	Total
Gaston County	83	67	65	50	27	292
Cleveland County	19	21	8	10	1	59
Lincoln County	3		1			4
Mecklenburg County	1	1				2
Montgomery County	1	1	1	1	1	5
Gastonia	19	10	9	2	8	48
Albemarle	15	5	12	8	6	46
Cherryville	2		1	4		7
Concord	1	1				2
Kings Mountain	11	4	1	3		19
Lincolnton		2	2	1		5
Charlotte	1	1	2		1	5
Shelby			2			2
State Department			1	1		2
Christian Film Company			2			2
Denoyer-Geppert Representative			1			1
Bioscope Company Representative				1		1
School Specialist Company Representative				1		1
Total attendance each day	156	113	108	82	44	503

Some of each of the types of terrariums--hillside, desert, marsh, and woodland--were made by the teachers. Several of these are pictured below.

An enthusiastic group of people enjoyed the activity. The group of teachers pictured above seemed to be a happy one.

On Wednesday there was a discussion of the function of a program of science in the elementary school, with emphasis on the proper use of films and filmstrips as effective teaching tools to broaden children's experiences.

Concepts of weather were the topics for the sessions on Thursday. The morning session was devoted to materials suitable for primary children, and in the afternoon more advanced materials were discussed. Suggestions for numerous experiments were mentioned, and several of these were demonstrated.

The discussion for Friday's sessions centered around the use of textbooks and other materials suitable for the elementary school. Actual demonstrations were given in relation to the use of material in a unit on machines for primary grades and one on electricity with methods and techniques suitable for both primary and upper grades.

A formal evaluation of the Peedin School Science Workshop was not made, but verbal statements from a great number of teachers and from others who attended the classes of activities seemed to indicate that it was of value to every participant.

<u>High Shoals Workshop</u>. Each of the workshops that had been held in the county had been requested by the teachers, and the activities included had been those

suggested by them. At each workshop several persons had expressed the desire for a workshop on the nature trail. One elementary school had established one adjacent to the school grounds in a location that was ideal, for it included a woodland area, open field, a young forest that had grown over an abandoned section that had once been farmed, a swift-water pool, a creek, a small stream, a deep gully that had been caused by erosion, a small hardwood forest, which was growing on a hillside after the large trees had been harvested, a wet-weather stream, and every step in plant succession from the crustose lichen to climax forest of hardwood trees.

A survey[13] was made in the county schools to determine the number interested in a nature trail workshop. Tabulations of the results are given in Table IX.

TABLE IX

RESPONSE TO QUESTIONNAIRE CONCERNING INTEREST IN A WORKSHOP ON NATURE TRAIL

Department	Number expressing interest
Primary teachers	82
Intermediate teachers	72
Junior high teachers	20
High school teachers	11
Number of schools represented----21	
Total	185

[13] Infra, Appendix F, p. 200.

The date for the workshop, fixed for November, 1955, was of necessity postponed until April, 1956.

The children of each grade in the High Shoals School had a definite interest in the trail. The primary grades prepared plant plots, planted seedlings of trees, and kept records of the number and growth of both plants and seedlings for the two years that they had worked on the trail. Various types of signs were made and erected by the seventh and eighth grades. The sixth grade built an outdoor classroom. The fourth grade claimed the "Listening Area," and the signs of rebus writing on the wooded area and in the open field for which they had made plans were theirs also. The fifth grade built a weather station on the school campus.

The students of each classroom selected a certain topic around which they prepared exhibits. Youngsters in the primary grades chose molds, magnets, simple machines, and animal tools and weapons; the fourth graders selected "light" as their theme; the fifth graders decided upon "electricity"; the students of the sixth grade built all their exhibits around the theme "sound," and the seventh graders took the "solar system" as their project since they were beginning the study in the social studies class; the eighth graders had "conservation" as their theme.[14]

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[14]A list of the exhibits is found in Appendix F, pp. 202-3.

Not only did they work on the trail and on the exhibits in the classrooms during the periods set aside for activities, but their work was correlated with English, spelling, arithmetic, and reading. Much research was necessary on many of the projects.

Every child in the school benefited in many ways as a result of this workshop. Many of them came to the afternoon and evening sessions and participated in the activities. They also served as guides and receptionists at each session.

Table X shows the attendance figures for the High Shoals Workshop.

TABLE X

ATTENDANCE AT THE HIGH SHOALS WORKSHOP

Persons attending	Number attending		Total
	During workshop	After workshop	
Primary teachers	50	3	53
Intermediate teachers	43	11	54
Junior High teachers	15	4	19
High school teachers	3		3
Principals	7	3	10
Parents	11	23	34
Other adults	10	3	13
Students	79	427	506
Totals	218	474	692

Seventeen schools were represented during the workshop and five afterward. The great number of students and teachers who came after the workshop had closed wanted to take a field trip over the Nature Trail. This total figure represents individuals, the greatest number of persons that attended any of the workshops. Each school day for three weeks, teachers and students scheduled trips over the trail.

Leaders for the workshop were an educational representative from the Wildlife Resources Commission in Raleigh, which is especially interested in conservation of natural resources; and the elementary school science instructor from East Carolina College at Greenville, North Carolina, who was formerly instructor of Natural Sciences at Columbia University, New York.

The program[15] for the workshop consisted of lectures, demonstrations, experiments, tours through the classrooms, and field trips over the Nature Trail.

Another interesting feature of the workshop was the display of exhibits from other schools in the county. There were beautiful pieces of ceramics and looper-clip rugs made by boys and girls of the East Belmont seventh grade; a collection of pearl buttons and the shells from which they were made, showing each step in the making of buttons, from the

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[15] Infra, Appendix F, p. 201.

sixth grade of Ranlo School; a collection of shells from the first grade of Lowell School; coal gardens, birds, handmade flowers, and indoor games also from Lowell School; a poster on minerals from Bessemer City School; and a poster, made in the form of a booklet, showing cut-outs of the organs of the body arranged three-dimentionally, by a tenth grade student from the Orthopaedic Hospital School.

CHAPTER V

TRENDS INDICATING IMPROVED SCIENCE INSTRUCTION IN THE GASTON COUNTY SCHOOLS DURING THE PAST FIVE YEARS

Among the major ways by which people learn are seeing and hearing. Audio-visual materials are the tools which are helps to listening and looking. Concrete experience is a further basis for understanding. A combination of these media tends to increase interest and enthusiasm, resulting in greater success in school.

These tools of learning are many and varied. Although visual aids have been used for decades, not until the past ten or twelve years has their effectiveness in classroom teaching been so widely recognized.

Use of Audio-Visual Aids and Other Media of Presentation

During the past five years many audio-visual materials have been purchased by the schools of Gaston County. The number of each type of equipment which was owned in 1950 and the number of each type that has been added in the four years from 1951 through 1954 are shown in Table XI, page 75. These aids are in virtually every school in the county. The smaller schools have the projectors, records, bioscopes, nature charts, and science kits.

TABLE XI

AUDIO-VISUAL EQUIPMENT IN THE GASTON COUNTY SCHOOLS
1950-1954

Item	Owned in 1950	Number added in				Total
		1951	1952	1953	1954	
16mm projector	26	3	4	1	1	35
Lantern slide projector	15	1	1	2	1	20
Filmstrip projector	24	4	5		3	36
Screens	37	2	8	1	3	51
Opaque projector	7	1	1		1	10
Wire recorder	4		1			5
Tape recorder	1	2	1	1		5
Radio	33		10		6	49
16mm films						
Filmstrips	797	6	232	44	251	1330
Record player	24		3	35	14	76
Records	1009	321	528	366	325	2549
Bioscope		26				26
Microscope			26			26
Nature charts		26				26
Science kits	26					26
Totals	2003	392	820	450	605	4270

These materials are used by each department in the schools. In some of the larger schools teachers utilize a variety much more than do those in the smaller schools. One explanation, perhaps, is the fact that the film projector is more often operated by high school boys; the filmstrip projector is easier to carry to the classroom, and more teachers will operate it. Each year more teachers and students are learning to operate all the machines. Tables XII

and XIII show the number of teachers reporting the use of the different types of audio-visual aids. Table XII is based on 1952 figures, while Table XIII is based on 1954 figures. A definite increase in the number of teachers reporting the use of these materials is apparent when the two tables are compared.

TABLE XII

USE OF AUDIO-VISUAL EQUIPMENT IN GASTON COUNTY SCHOOLS
1952

Item	Number of teachers reporting its use			
	Primary	Intermediate	Junior high	High school science
16 mm projector	11	12	12	3
Filmstrip projector	16	16	13	3
Opaque projector	5	7	5	1
Microscope	8	13	12	3
Magnifying glass	7	16	11	3
Hand lens	4	8	9	3
Bioscope	3	11	11	3
Tape recorder	3	5	3	
Record player	14	16	11	1
Totals	71	104	87	20

TABLE XIII

USE OF AUDIO-VISUAL MATERIALS IN GASTON COUNTY SCHOOLS
1954

	Number of teachers reporting the use			
	Primary	Intermed-iate	Junior high	High school science
Flat pictures	28	27	24	6
Photographs	21	10	10	3
Collected specimens	23	13	9	4
Black and white slides	4	9	6	1
Colored slides	6	8	6	
Filmstrips	16	15	10	3
Films, 16mm	22	13	10	3
Live objects Plants and animals	16	14	12	4
Inanimate objects Rocks	25	16	10	4
Minerals	6	9	9	4
Plastomounts	1	2	3	1
Slides for bioscope	3	6	7	4
Totals	171	142	116	37

Many children's experiences are limited in various subjects that are studied in the classroom. By using different media of presentation, a teacher may achieve greater results.

Other media of presentation that have become more widely used since 1950 are bulletin boards, flannel boards, posters, models, and dioramas. Table XIV shows the amount of increase in the use of different media of presentation from the year 1950 to the year 1954. According to these figures the teachers in the intermediate grades showed the greatest amount of increase.

TABLE XIV

INCREASE IN THE USE OF MEDIA OF PRESENTATION IN THE GASTON COUNTY SCHOOLS--1950 THROUGH 1954

Department	1950	1954	Amount of increase
Primary	32	71	39
Intermediate	29	145	116
Junior high	55	73	18
High school--science	5	47	42
Totals	121	336	215

Use of Methods of Presentation

Changes in methods of presenting science information to students in the classroom have increased during the past five years. Instead of using textbooks, supplementary readers, and library books as the only methods of presentation, teachers and students have learned that much more can be accomplished if they use a variety of activities. Some of the most popular activities are problem solving, teacher-pupil planning, discussion, experiments, constructing and manipulating, observing, collecting, consulting authorities, field trips, evaluating, using homemade equipment, and having resource people to talk with the students about subjects that are of interest to them.

Table XV shows the number of changes in methods of presentation from 1950 to 1954 as reported by the teachers of Gaston County.

TABLE XV

INCREASE IN THE CHANGE OF METHODOLOGY FROM 1950 TO 1954 IN THE GASTON COUNTY SCHOOLS

Department	Number of changes in methods reported		Amount of increase
	1950	1954	
Primary	82	165	83
Intermediate	116	289	173
Junior high	82	167	85
High school--science	8	61	53
Totals	288	682	394

Examples of some of these methods of presentation of science materials are included in this study in order to show the interest and enthusiasm that are manifested when the opportunity is given to children to "learn by doing." There are many ways of finding information which are interesting and profitable to children, provided they are purposeful activities. Curiosity and the desire to explore are innate drives evident in all normal behavior. The natural tendency to observe may be used by the teacher as a technique of learning which will provide a happy experience for children. They are interested in how things look, how they act, what changes occur, and how plants and animals are interdependent. Verification of this interest was secured through a survey made in the Gaston County schools the latter part of the 1955-56 school term. Following are partial results of this survey.

Observation. Primary, intermediate, and junior high schools students reported that they were interested in pets, weather, getting ready for winter, development of frogs from the eggs to maturity, magnets, evaporation, hibernation, seasons, and birds. The high school students used observation to notice how their preserved specimens and tissues looked under the microscope; how the paramecium, amoeba, fish, and other animals acted in various situations; and how changes

occurred in experiments. Table XVI shows the number of grades in the different departments of the schools that used observation as a method of presentation, or a technique for gaining information.

TABLE XVI

USE OF OBSERVATION AS A METHOD OF PRESENTATION BY STUDENTS IN GASTON COUNTY SCHOOLS

Purpose of observation	Number of grades using			
	Primary	Intermediate	Junior high	High school
TO SEE				
How things look	3	0	17	2
How things act	3	0	16	2
How things change	3	1	17	2
How plants and animals are interdependent	1	1	1	2

An example of a seventh grade activity which employed this method follows.

Topic or problem----------How Do Frogs Develop?

Technique illustrated----Observing

Grade--------------------Seventh

Having heard Dr. Heckenbleikner by radio discuss frogs and peepers, we got into a lively class discussion about frogs. To settle some questions and to give all a chance to see how frogs develop, we set up a simple aquarium in

the schoolroom. We got frog eggs and some plants from a nearby pond and placed them in the aquarium. With naked eyes and with lens we observed the embryos within the eggs by spooning out eggs daily onto glass slides and observing changes.

One Monday we discovered several tiny tadpoles swimming about in the aquarium. There they were, but no one had seen them emerge from the eggs. Next day more lively tadpoles and fewer embryos were in the aquarium, but still no one had seen how a tadpole leaves the egg. We posted a spy to keep close watch. Spies changed at close intervals.

"I saw one! I saw one!" said the child. Wide-eyed with excitement he told how he saw it leave the egg. Arithmetic forgotten, others clustered around the aquarium. A bump on the glass furnished the stimuli needed; other tadpoles emerged.

Now we are watching tadpoles grow and we are finding that proper balance between animal life, plant life, and water volume above clean coarse sand must be maintained. Science isn't just labs and smells and test tubes. Science can't be nailed into one period or class. Let children learn to open their eyes and look. There is a world of science wherever they are, and life becomes more interesting if they learn to see the world about them. More questions come crowding. Books, authorities, and further observations will furnish answers. What do tadpoles eat? How long will they be tadpoles? How do they breathe? What changes does a tadpole undergo to become a frog? What do frogs eat? How do they get their food? Can frogs live in an aquarium? Why not? What is an amphibious animal?[1]

Collecting. Collecting seems to be instinctive with many boys and girls. In school, however, careful teacher-pupil planning should be done to prevent a conglomeration of materials that would probably not be used for some time

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[1]Miss Bertie Lee Whitesides, seventh grade teacher, North Belmont School, Gaston County, North Carolina.

if ever. Often collections of the same materials are made in several grades. When such repetition occurs, each ensuing grade should study the materials on a higher level.

Many kinds of collections have been made in Gaston County Schools, as is evidenced by figures 8 through 15, pages 84 through 91. These are but a few of those that were displayed in the schools, but these show the kinds and types of collections made.

An illustration of the manner in which one grade used the technique of collecting follows.

Topic or problem---------What Lives in North Carolina?

Technique illustrated----Collecting and Exhibiting

Grade--------------------Eight

We began our school year in science work with the collecting of specimens of different forms of life in our own state. The late summer is an excellent season for this type of work; the specimens are used for further study in developing our topic through other techniques of learning in the classroom, library, and home.

Collecting is a natural desire of mankind; we directed this interest toward specimens of wildlife in North Carolina. It became a contest to see how many different insects, reptiles, trees, or wild flowers that each of us could identify as inhabitants of our state. We became very observant of all forms of life and the interdependence of living things upon one another in their natural habitat.

Conservation must be emphasized in collecting to avoid wasteful collecting or collecting without a purpose or motive. It was understood that each student could choose specimens for our class museum, and he could identify

OUTDOORS

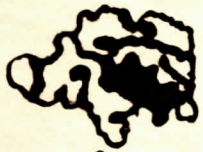
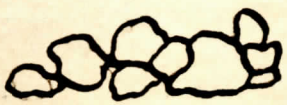
			1950	1951	1952	1953	1954
Wildflowers		Primary.			3	3	16
		Intermediate .			1	1	12
Moss		Primary.	1	1	3	3	17
		Intermediate .					11
Ferns		Primary.	1	1	3	3	12
		Intermediate .					11
Lichens		Primary.	1	1	2	2	1
		Intermediate .					6
Rock Garden Plants		Primary.	1	1	3	3	9
		Intermediate .					5
Shrubs		Primary.	1	1	1	1	10
		Intermediate .					7
Rocks		Primary.			1	1	17
		Intermediate .					8

FIGURE 8

NUMBER OF COLLECTIONS IN SCHOOLS OF GASTON COUNTY

OUTDOORS		1950	1951	1952	1953	1954
Wildflowers		Junior High. .		1		7
		High School Science . . .				1
Moss		Junior High. .			1	8
		High School Science . . .				1
Ferns		Junior High. .				5
		High School Science . . .				1
Lichens		Junior High. .				4
		High School Science . . .				1
Rock Garden Plants		Junior High. .				5
		High School Science . . .				0
Shrubs		Junior High. .		1	2	3
		High School Science . . .				1
Rocks		Junior High. .				0
		High School Science . . .				9

FIGURE 9

NUMBER OF COLLECTIONS IN SCHOOLS OF GASTON COUNTY

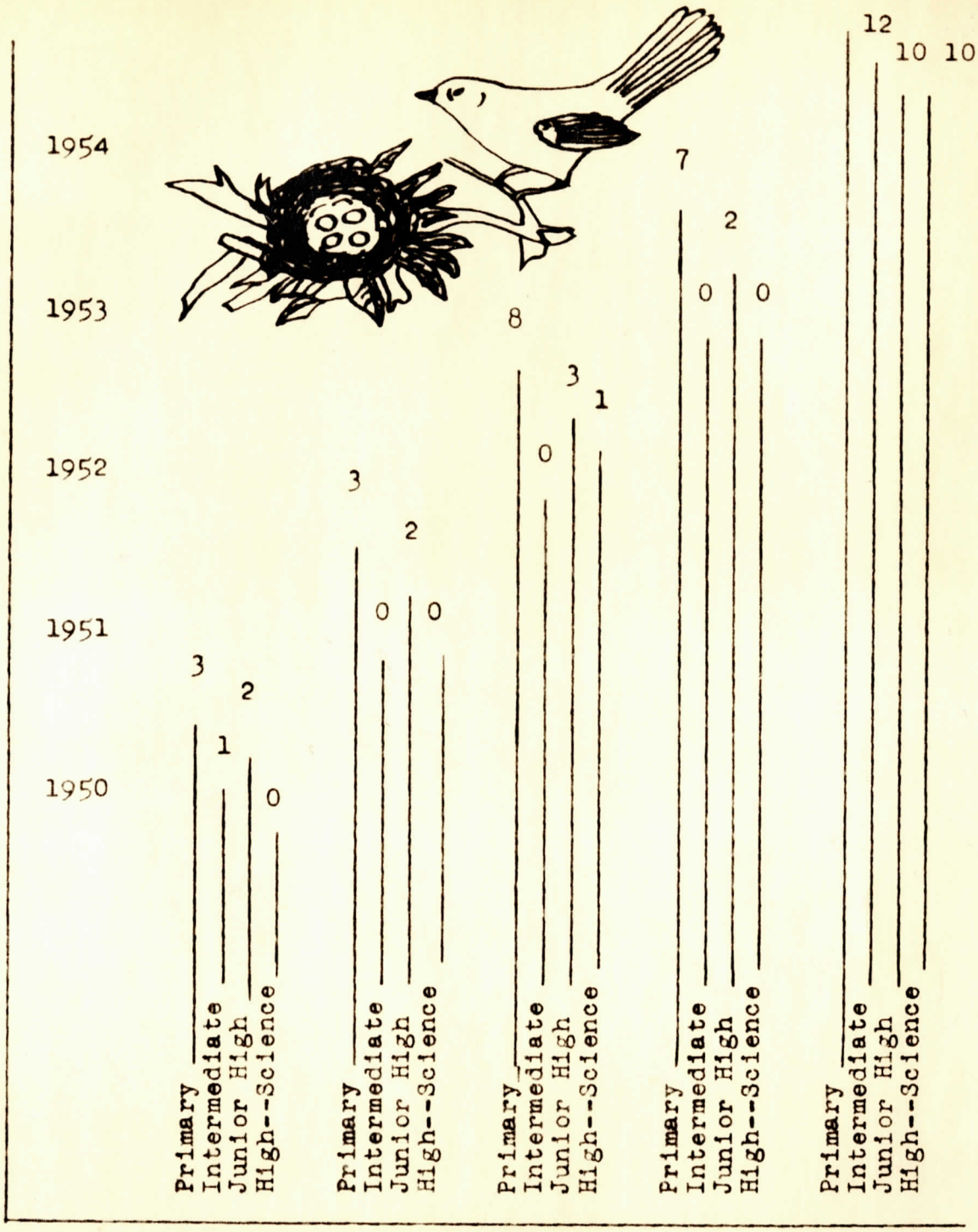


FIGURE 10

COLLECTIONS OF BIRDS' NESTS IN GASTON COUNTY SCHOOLS

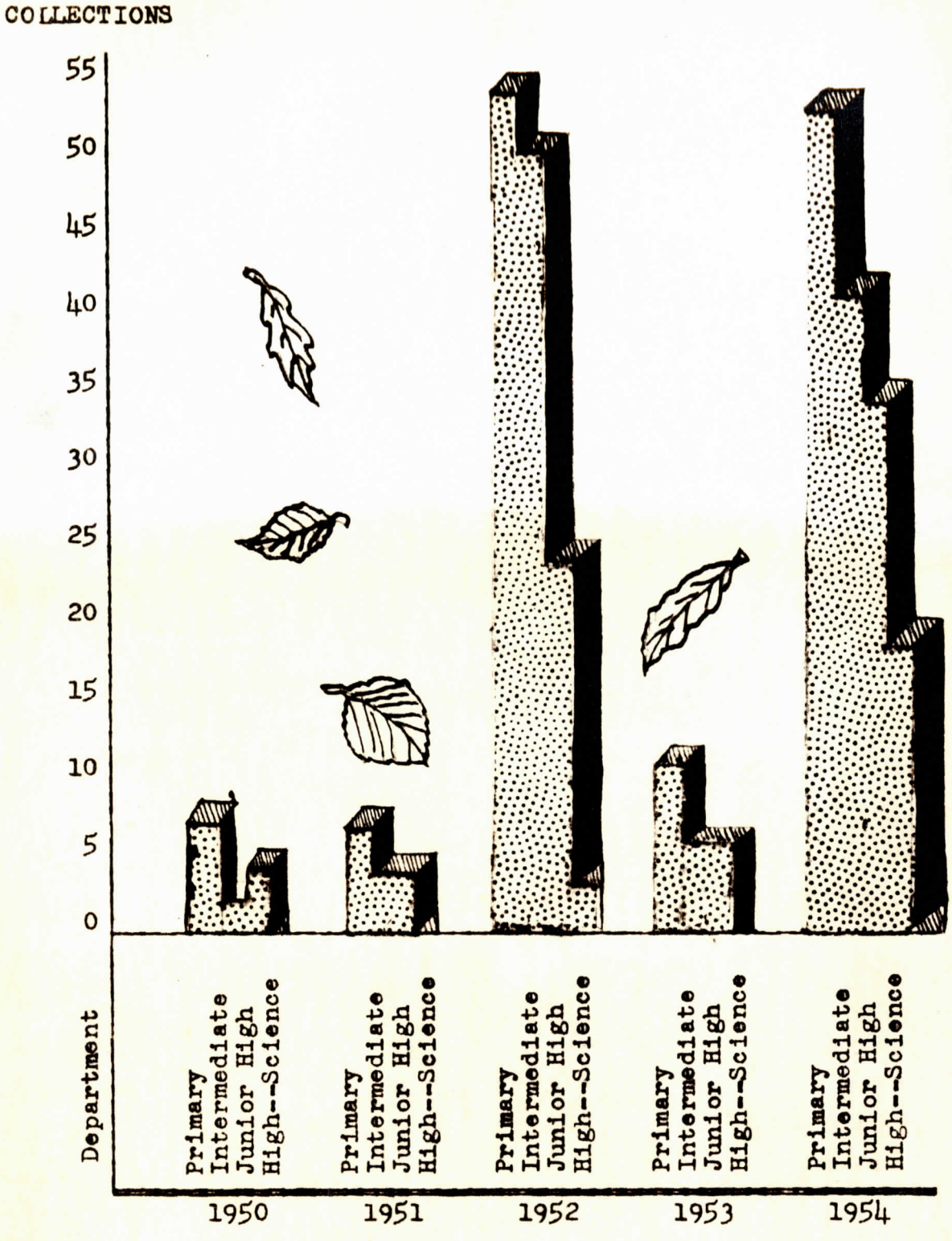


FIGURE 11

NUMBER OF COLLECTIONS OF LEAVES IN GASTON COUNTY SCHOOLS

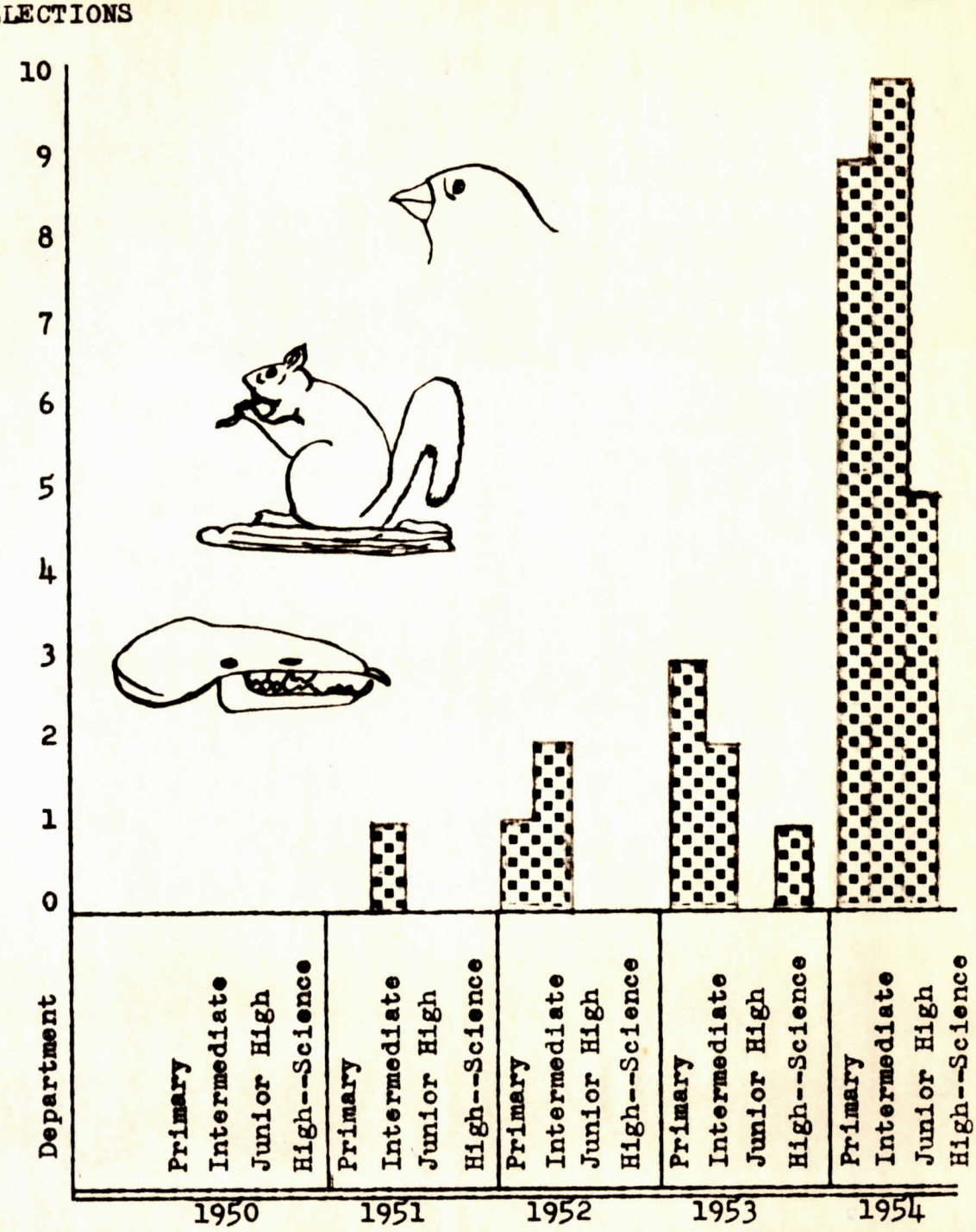


FIGURE 12

NUMBER OF COLLECTIONS OF ANIMAL TOOLS AND WEAPONS IN THE SCHOOLS OF GASTON COUNTY

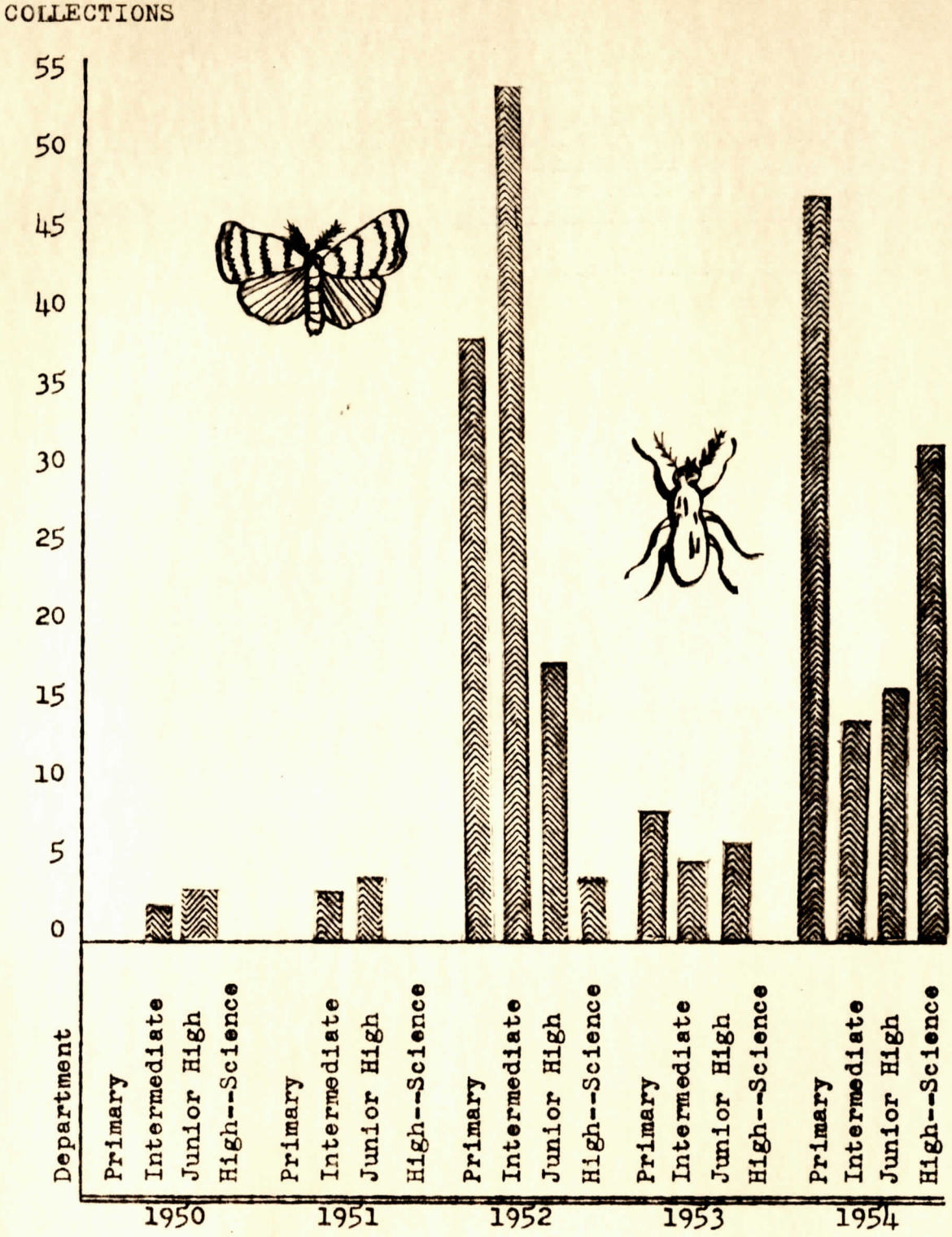


FIGURE 13

NUMBER OF INSECT COLLECTIONS IN THE SCHOOLS OF GASTON COUNTY

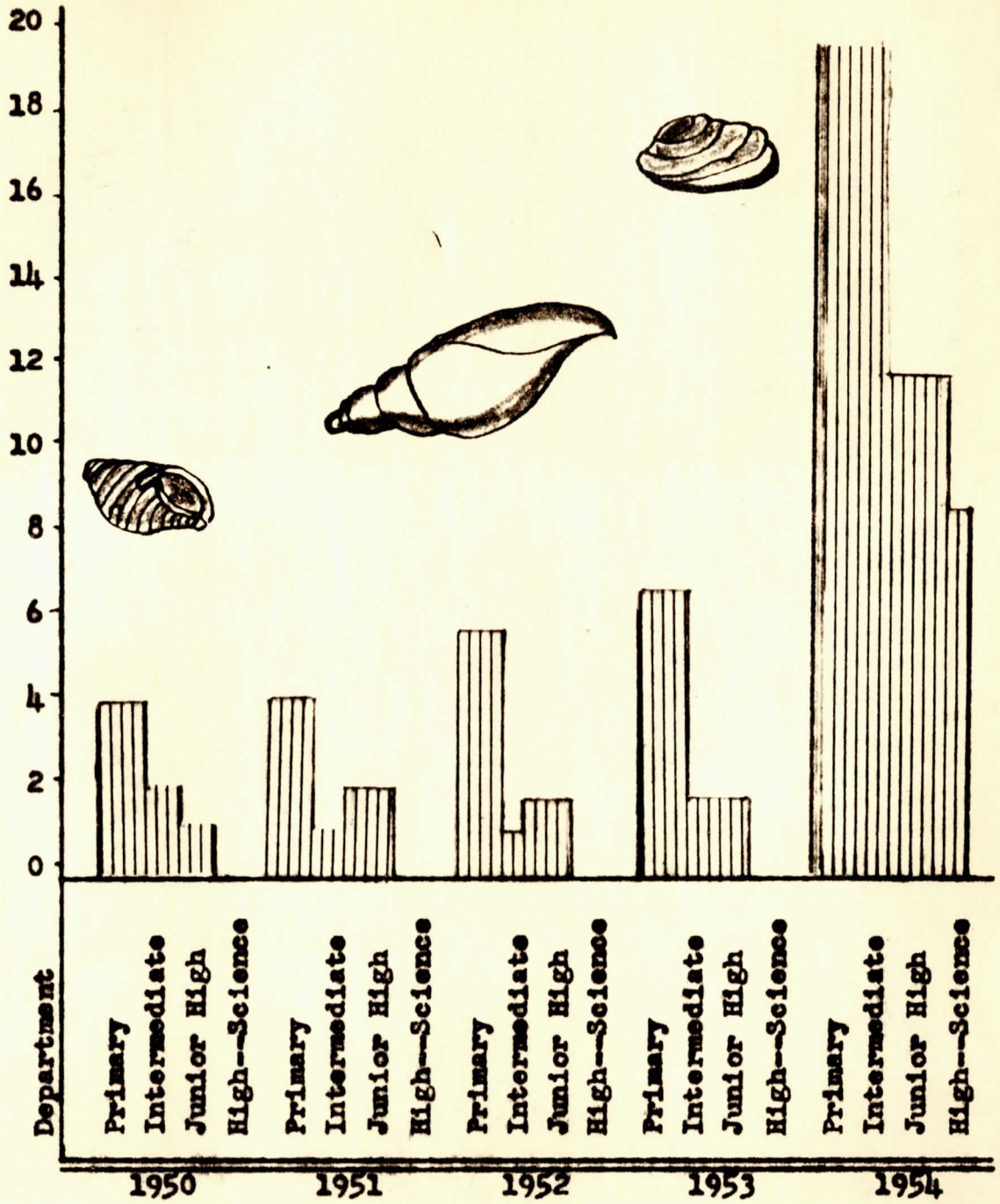


FIGURE 14

NUMBER OF COLLECTIONS OF SHELLS MADE IN THE GASTON COUNTY SCHOOLS

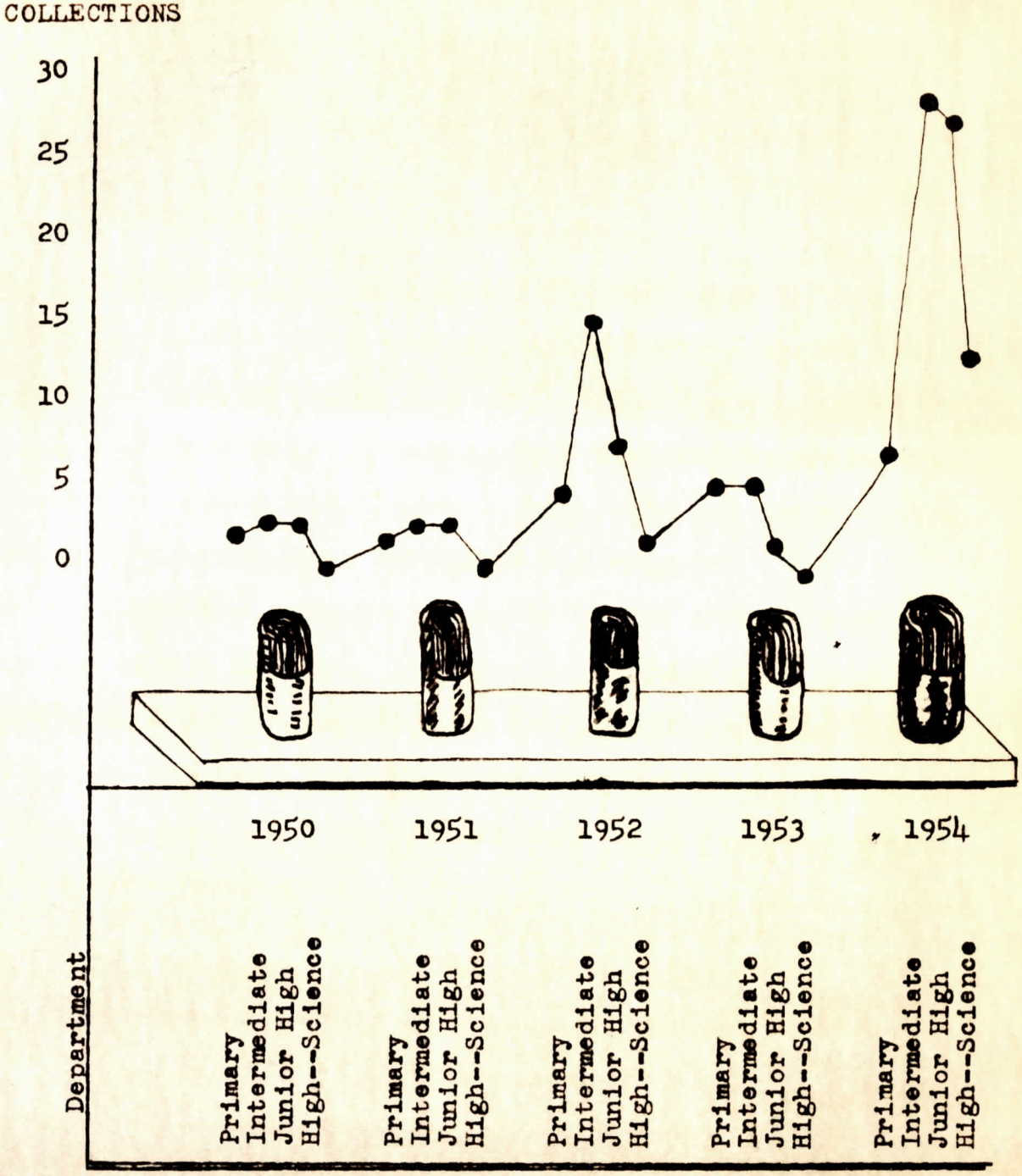


FIGURE 15

NUMBER OF WOOD COLLECTIONS IN GASTON COUNTY SCHOOLS

his specimens from a careful study of books, charts, and slides; then label them carefully and correctly. Each student prepared his specimens for exhibition by following directions for mounting and preserving them. The student became the class authority on his specimens; thus all were able to share their learning with one another.[2]

Field trips. How interesting and valuable a field trip can be when it is well-planned cooperatively by teacher and students! Every field trip taken should be for a definite purpose. It should help children to become more observant and to gain a greater knowledge and understanding of the interdependence of plants and animals.

Valuable information may be gained from a field trip on the school grounds. Many of the commonplace things that are seen every day become more interesting when they are examined closely. One eighth grade class found this to be true. In the following article they have given an account of their experiences.

Topic or problem----------Plant Life

Technique illustrated---------A Field Trip

Grade----------Eight

One day last fall as we were on the playground, a student, pointing to a flaming crepe myrtle, asked, "What is that?" When asked what other nearby plants were, he was equally "in the dark." Right then we

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[2]Mrs. Hazel H. Hill, eighth grade teacher, North Belmont School, Gaston County, North Carolina.

decided to begin the study of plant life around us.

> Armed with pencils and notebooks, the class started on a field trip on the school grounds. Each student listed all the trees, plants, and shrubs that were discussed, from lowly privet hedge to mock orange. Each brought back a leaf specimen which he secured information on. Then a paragraph was written about it, which he read to the class. Afterward the specimens were labeled, pressed under glass in a case, and kept as part of our science collections.
>
> This week our class again explored the school grounds to check on what was remembered from last fall. Many trees and shrubs were in bloom, and the students were impressed by their beauty and usefulness. Of course not every tree and shrub was remembered, but the students could name many, and they have gained an appreciation of plant life that can always give them pleasure.[3]

Surveys made in the county schools in 1952 and 1954 showed a great deal of interest in field trips as a technique for gaining scientific information. Most of the schools in the county reported that field trips were made. Table XVII shows the number of rural and urban elementary and high schools in Gaston County; it also shows how many of these schools responded to the 1952 and the 1954 questionnaires. This information was necessary in order to interpret Table XVIII, which shows the number of the departments in the responding schools that used field trips.

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[3]Mrs. Gertrude T. Brawley, eighth grade teacher, Victory School, Gaston County, North Carolina.

TABLE XVII

NUMBER OF GASTON COUNTY SCHOOLS RESPONDING TO QUESTIONNAIRES 1952 AND 1954

	Elementary schools		High schools	
	Rural	Urban	Rural	Urban
Number of schools in Gaston County	5	20	1	8
Number of schools responding to questionnaires:				
1952	3	20	0	4
1954	5	17	1	7

TABLE XVIII

NUMBER OF DEPARTMENTS IN GASTON COUNTY SCHOOLS REPORTING USE OF FIELD TRIPS AS A METHOD OF PRESENTATION

Department	Number reporting use of field trips in	
	1952	1954
Primary		
Rural	2	3
Urban	19	17
Intermediate		
Rural	2	4
Urban	19	16
Junior high		
Rural	3	4
Urban	18	15
High school--science		
Rural	0	1
Urban	1	7

Table XIX shows the number of individual teachers in the various departments of the rural and urban schools who reported using field trips in their teaching of science. For comparison purposes the number of teachers in the county is also given. These figures are based on 1952 reports.

TABLE XIX

NUMBER OF TEACHERS WHO REPORTED THE USE OF FIELD TRIPS AS A METHOD OF PRESENTATION IN THE GASTON COUNTY SCHOOLS

Department	Total no. of teachers		Teachers reporting use		Per cent	
	Rural	Urban	Rural	Urban	Rural	Urban
Primary	14	139	6	46	43	33
Intermediate	12	127	5	51	42	40
Junior high	8	73	6	34	75	47
High school Science	1	17	0	4	00	23
Totals	35	356	17	135	46	38

A greater number of trips were taken by the students and teachers of the urban schools than by those of the rural schools. A larger per cent of the rural teachers reported having taken trips in 1952, however, as is shown by the table. Table XX shows the number of local field trips taken by the various departments of the schools; it also shows the topics under study. Figures for 1952 and 1954 are given.

TABLE XX

NUMBER OF LOCAL FIELD TRIPS TAKEN BY THE VARIOUS DEPARTMENTS OF THE GASTON COUNTY SCHOOLS AND TOPICS FOR STUDY

Topics for study	Number of trips taken in 1952				Number of trips taken in 1954			
	Primary	Intermediate	Junior high	High--science	Primary	Intermediate	Junior high	High--science
Forests	19	36	30	8	3	9	8	1
Wildlife	15	30	7	4	5	10	7	3
Minerals	3	13	8	2	1	8		
Wildlife homes	2				6	7	3	3
Birds	4	1			1	8		
Insects	2		1					
Seeds	2							
Rocks	1	1						
Soils	4	16	12	4	4	9	8	2
Wildflowers	6	3	1		7	9	6	2
Crayfish	1							
Leaves		2	1					
Clouds		1						
Animals	3				3	8	7	
Color in nature		1						
Design in nature		1						
Balance in nature					3	9	7	3
Interdependence of plants and animals					4	10	7	2
Variety					3	4	5	2
Adaptation					2	9	8	2
Erosion					3	10	9	2
Waterlife					2	8	5	2
Animal tracks					6	12	4	1
Farm	1	3	1	1	4	15	3	1
Dairy	1				10	4		1
Textile plants						6		
Pasteurization						1		
Chemical laboratory								1
Bakery	1	1						
Steam plant							1	2
Well and spring	1							
Totals	66	109	61	19	77	156	88	30

Table XXI shows the number of distant field trips taken and the topics for study, based on 1952 and 1954 figures.

TABLE XXI

NUMBER OF DISTANT FIELD TRIPS TAKEN BY THE VARIOUS DEPARTMENTS OF THE GASTON COUNTY SCHOOLS AND TOPICS FOR STUDY

Topics for study	Number of trips taken in 1952				Number of trips taken in 1954			
	Primary	Intermediate	Junior high	High--science	Primary	Intermediate	Junior high	High--science
Wild Goose Refuge	1	11	4	1	1	2	1	
Nature Museum Charlotte	7	16	4	1	9	22	5	1
Nature Museum Raleigh	1	8	11			7	18	
Planetarium Chapel Hill		3	7				16	1
Science Symposium								2
Airport, Charlotte					3			
Lance Packing Company					2			
Weather Bureau					1			
Bird Farm								1
Tropical Aquarium								1
Tobacco Factory							1	
National Zoo							1	
Smithsonian Institute			3	2			2	
Mica Mine							1	
Dye Company								1
Carbon Plant								1
Southern Dye Company								1
Tin, Gold Mines		2	1					
Linville Caverns		1	4					
Wachovia Museum Winston-Salem			1					
Totals	9	41	35	4	16	31	45	9

Experiments. Children like to handle materials and to try to find out how things work. Experiments provide an interesting way of satisfying their curiosity, of giving an opportunity for developing scientific thinking, and of encouraging them to use their own initiative in finding a successful solution to many problems. Experiments add interest to a science lesson. Where there is interest, there is learning.

The pupils in one combination fourth and fifth grade classroom experienced many enjoyable moments in conducting an experiment on nutrition. They not only reaped enjoyment from the project, but they received personal benefit from their study.

Topic or problem----------Nutrition

Technique illustrated----------An Experiment

Grade----------Four and Five

In our combination fourth and fifth grade classes we worked out an experiment to prove that health is worthwhile, and that it must be worked for. In considering the physical qualities needed by a successful person, these were discussed: a body always under control; good coordination of hand and eye; endurance; strong muscles; freedom from fatigue.

To prove that food plays an important part in health, we experimented with white rats. One was given a diet of bread and milk; the other was given bread and coffee. In a short time Jerry Coffy grew thinner, his hair was not so glossy, nor his eyes so bright. He was restless, and became irritable, while Tommy Milk was sleek, plump,

and playful. In one week Tommy Milk had gained nineteen and one-half grams, while Jerry Coffy had gained only two and one-half grams. After a time the diets were switched, and the appearance and behavior of the rats were reversed.

Since milk made such a difference in the diet of our rats, the boys and girls inferred that it would make just as much difference in their own appearance and behavior.

They were interested in further experiments to separate milk into its component parts and to learn the importance of each.

During this study the children became food-conscious and inquired about their own foods and their values. This led to the coloring of dowel sticks and arranging them in a form to show the value on shares of many foods.[4]

Many and varied are the experiments that have been carried out by children in the classrooms of Gaston County. Many times the boys and girls said that they enjoyed the lesson so much more when they could do experiments, that they liked that kind of science, or that science had more meaning when they could experiment. Much interest and serious thought was given to experiments when they did not work out exactly right. The challenge then was for them to find and correct their mistakes.

Table XXII shows the number of teachers in the various departments of the schools reporting the use of different types of experiments.

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[4]Miss Elizabeth Sandifer, fourth and fifth grade teacher, Cramerton School, Gaston County, North Carolina.

TABLE XXII

NUMBER OF TEACHERS REPORTING VARIOUS TYPES OF EXPERIMENTS USED

Type used	Number of teachers reporting use			
	Primary	Intermediate	Junior high	High school science
Simple	11	11	9	1
Controlled	3	5	6	1
Applied	3	4	4	1

Table XXIII summarizes the number and specific kinds of different experiments performed by the various departments in the Gaston County schools. The experiments included in this table were listed on one or both of the 1952 and 1954 questionnaire replies.

TABLE XXIII

NUMBER AND KIND OF SPECIFIC EXPERIMENTS PERFORMED BY THE VARIOUS DEPARTMENTS OF THE GASTON COUNTY SCHOOLS 1952 AND 1954

Department	Specific experiment reported	Number reporting
Primary	Color in meals	1
	Balanced meals	2
	Simple water experiments	1
	Magnets	1
	Wind	1
	Planting seeds	1
	Evaporation	1

TABLE XXIII (continued)

Department	Specific experiment reported	Number reporting
Primary	Air about us	1
	Rooting flowers	1
	Watching leaves grow	1
Intermediate	Nutrition (white rats)	3
	Nutrition (guinea pigs)	1
	Menus	1
	Carbon dioxide and water	1
	Electricity and magnetism	1
	Sound, vibration	1
	Bread mold	1
	Starch	2
	Foods	2
	Soil and water, effect on plants	1
	Making alcohol	1
Junior high	Calories for individuals	2
	Making alcohol	1
	Starch in foods	1
	Sprouting seeds	1
	Rooting plants	1
	Dissolving bone in acid	1
	Power of wind, windmill	1
	Speed of wind, anemometer	1
	Evaporation	1
	Osmosis	1
	Plant needs	1
	Germination of seeds	1
	Propagation, eight ways	1
	Air pressure	1
	Air expansion	1
	Condensation	1
	Dehydration--drying leaves	1
	Chlorophyll, extraction	1
High school science	Osmosis	1
	Evaporation	1
	Weather station	1
	Nutrition (white rats)	2

TABLE XXIII (continued)

Department	Specific experiment reported	Number reporting
High school science	Nutrition (guinea pigs)	1
	Preparation of face powder, face cream, hand lotion	1
	Preparation of paint pigments	1
	Removal of stains	1
	Testing coffee for caffein	1
	Amount of water in peas	1

Consulting authorities. Science information can be secured from numerous sources and in a variety of ways. Answers to many problems may be found by observation, by simple experimentation, and by reading books, magazines, and articles written by persons who have spent much time and thought in studying the subjects. Many authentic films and filmstrips may be used to broaden children's experiences. Local authorities in every field of industry are glad to visit classrooms and discuss subjects which constitute their chief interests.

Table XXIV indicates the frequency with which resource persons are used in science study in the schools of Gaston County. The information given consists of the resource person consulted, the total number of grades consulting him, both by rural and urban schools. Figures are given for both 1952 and 1954.

TABLE XXIV

FREQUENCY WITH WHICH RESOURCE PEOPLE ARE USED IN GASTON COUNTY SCHOOLS 1952 AND 1954

Resource person	Total number of grades reporting use			
	Rural schools		Urban schools	
	1952	1954	1952	1954
County forester	3	8	6	5
Soil conservationist		6	14	7
Game protector			16	1
Farm agent	1		5	
District biologist	1		8	
Wildlife representative	16		123	
Sanitarian			2	1
Mineralogist			1	
Textile official				13
Botanist				1
Electrician				4
Geologist				1
Merchant		1		3
Dentist				4
Mechanic				1
Nurse				1
Chemist				2
Banker				1
Radio technician				1
Doctor				1
Totals	21	15	175	47

Teacher-pupil planning. Another very important technique for teaching is teacher-pupil planning. "There is need for genuine teacher-pupil planning in the classroom to make science more than textbook reading."[5] Every child should

[5]Julia Wetherington (ed.), Science for the Elementary School, Publication No. 293 (Raleigh: State Department of Public Instruction, 1953), p.

have an opportunity to participate in some way. This participation gives the feeling of being able to contribute constructively to the classroom program, the sense of belongingness in class activities, the feeling that the ideas of individuals are respected, and the building up of mutual respect between teacher and students. Much more interest is shown by children when they feel that they have a part in helping to plan their activities. Discipline problems are often reduced to nil and the students have the desire to make the program succeed.

Table XXV lists some problems or projects which are representative of those that may be planned cooperatively by teachers and students. Figures are given showing the number of problems planned cooperatively by students and teachers in the various departments of the Gaston County Schools. Figures are based on 1954 questionnaire replies.

TABLE XXV

NUMBER AND TYPES OF PROBLEMS PLANNED COOPERATIVELY BY TEACHERS AND PUPILS IN GASTON COUNTY SCHOOLS

Problem	Total number of problems planned cooperatively in various departments			
	Primary	Intermediate	Junior high	High school science
Making an aquarium		5		
Making a terrarium		5		
Beautifying school grounds			7	
Local field trips	62	105	60	27
Distant field trips	16	31	45	6
Bird photography				1
Proper farming methods				1

Discussion. Much thought and planning are essential to leading or entering into a discussion. Practice enables children to acquire freedom of expression, poise, clarity of expression, and the ability to stay on the subject. Children need frequent opportunities to enter into discussions, since many values are gained through this method of expression.

Table XXVI gives the answers to several questions concerning the use of discussion as a technique for teaching science: (1) Who chooses the topic for discussion? (2) Who leads the discussion? (3) What are some types of discussion used? (4) What are some values gained from the use of discussion? Figures are based on the year 1954.

TABLE XXVI

USE OF DISCUSSION AS A TECHNIQUE IN TEACHING SCIENCE IN THE GASTON COUNTY SCHOOLS

Person choosing topic for discussion	Number reporting			
	Primary	Intermediate	Junior high	High school science
Teacher	3	3	3	1
Students	4	7	4	
Both	10	13	11	1

TABLE XXVI (continued)

Person leading discussion	Number reporting			
	Primary	Intermediate	Junior high	High school science
Individuals	8	10	11	
Panel--students	7	9	9	1
Teacher	3	3		
Type of discussion				
Extemporaneous	8	10	10	
Purposeful	13	11	9	1
Well-guided	10	11	10	1
Values gained				
Power to identify problem	10	13	8	1
Power to evaluate pertinent data	8	8	7	
Power to weigh statements	8	10	8	1
Power to select choice material	12	10	8	
Power to think scientifically	15	13	11	1
Respect for authoritative information	13	11	10	1

Constructing and manipulating. How children like to make something! Very likely their comments are: "This is fun!" "I like this kind of science!" "I learn more when we make things."

Children grow by making and handling materials. Science becomes more fun and of greater value to them because they have the opportunity to "do things" or to "make something." Science becomes a living subject to them, not something about which they read from the science textbook. By being permitted to construct objects or materials for use in science projects, they become familiar with tools; they learn how to handle them, how to utilize materials that would perhaps be of little value elsewhere, how to conserve materials, how to care for and store tools, and how to work with others cooperatively.

Materials for use need not be too expensive. So many things may be brought from home or salvaged from places where they have been discarded. Often they may be had just for the asking. Many things can be made from milk cartons, corrugated cardboard boxes, honeysuckle vines, discarded Christmas lights, sections of water hose, native clays, nuts from hardwood trees, weed seeds, seeds of all kinds of trees, grains, scraps of sheetrock and other building materials, tin cans, and many other ordinary materials.

Boys, and sometimes girls, in the intermediate grades

often like to make bird houses. The following describes the way one fourth grade group carried out its project.

Topic or project----------An Invitation to the Birds

Technique illustrated-----Construction

Grade----------Four

As spring came, the birds greeted us every morning with their cheerful singing; it made us feel happy and gay throughout the day. We wanted to make the birds feel welcome so we began to make things for them.

One group of boys planted multiflora rose borders around the boundary of the school campus. Birds like this shrub for protection and feeding. By doing this work the boys not only learned the importance of how to plant and cultivate shrubbery, but they also learned the importance of plant life to the feeding of animal life.

Other boys and girls built bird houses from boxes and salvaged scrap lumber. Some put their houses in sheltered areas of the school campus to encourage birds to nest and raise their young near school where we can observe their nesting habits and the caring for their young.

Other boys and girls took their bird houses home and placed them near their own houses to attract birds there. Many set up bird baths and feeding stations on their lawns.

Our school campus and our community are fast becoming a birds' paradise.[6]

Table XXVII illustrates the use of constructing and manipulating as a technique for teaching science, by listing various projects undertaken in the Gaston County Schools.

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[6]Helen Hudspeth, fourth grade teacher, Ranlo School, Gaston County, North Carolina.

The figures are based on replies to the 1954 questionnaire.

TABLE XXVII

USE OF CONSTRUCTION AND MANIPULATION AS A TECHNIQUE FOR TEACHING SCIENCE IN THE GASTON COUNTY SCHOOLS

Project	Number from each department reporting use			
	Primary	Intermediate	Junior high	High school science
Insectarium	1	1	1	1
Formicarium		1	1	1
Vivarium				1
Apiary		1		
Weather instruments	2	2		
Chemical barometer	2	2	2	2
Thermometer	27	12	2	2
Electric naming boards:				
Birds	2	1		
U. S. map			1	
Skeleton			1	1
Bird houses	19	43	18	1
Feeding stations	7	27	13	1
Baths	2	3	2	
Eggs, plaster	1	1		
Telegraph instrument		2	3	
Motor			2	1
Volcano		12	13	
Bell buzzer			2	
Bioscope slides	1	5	1	3
Solar system			5	
Ceramics	2	14	8	2
Hooked rugs	1	5	2	1
Leathercraft		3	2	1
Metalcraft		2	2	1
Shellcraft		4	2	1
Culture pools		2	2	1
Cover for wildlife		5	8	1
Flower garden	30	24	10	
Vegetable garden	16	3		
Erosion control	5	11	8	
Model airplanes		25	23	10

TABLE XXVII (continued)

Project	Number from each department reporting use			
	Primary	Intermediate	Junior high	High school science
Model ships		16	10	
Model solar system		2	28	7
Chemical gardens		1		
Tanning muskrat hides				1
Rooting begonias			2	
Hatching frog's eggs	2		1	
Totals	120	230	175	40

Evaluation. Careful consideration should be given to the outcomes or to the progress made when any type of activities are completed. Because they can view the program as a whole, including both curriculum and methods, teachers are in a special position to make an evaluation. They should certainly take stock of their year's work to determine the value of the experiences they have offered the students under their care. Teacher evaluations are important, but students are also very helpful in making evaluations. They know when they have done well, if there was interest and enthusiasm among the students, and if they accomplished desirable results. They can offer valuable suggestions for improvement of a program.

Written tests help to measure results, but the most important outcomes cannot be measured by this method. As yet there are no reliable methods for measuring the most important outcomes of a science program.[7] "The important outcomes are the attitudes that pupils develop, the skills they gain, and the habits they acquire."[8] To make an evaluation teachers should look for pupil interest, pupil participation, pupil interest in talking about their experiences outside of the classroom.

Specific achievements can be measured by the number of experiments carried out, the field trips taken, the projects completed, the number of science books and magazines read, and the audio-visual materials used.

Signs of pupil growth may also be detected. Did the usually quiet children take part in activities? Did any of the normally inactive children become leaders of group work? Did the slow readers find information in books or magazines? Did the students produce a high quality of work?[9]

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[7] Walter A. Thurber, Exploring Science (New York: Allyn and Bacon, 1955), p. 11.

[8] Ibid.

[9] Ibid., p. 12.

"To measure the progress of individuals look for interest, effort, growth, and achievement."[10] Measurement must be individual, for no two children can be judged by the same standards.

Techniques and Results

At definite intervals teachers like to evaluate the quality and quantity of what their students have learned about units of work which have been completed, or what general information that they have retained. Growth in the stock of facts accumulated is easier to measure than the growth in development of the scientific attitude and the ability to think logically with an unbiased opinion devoid of superstition.

It is important, however, to "take stock" from time to time in order to determine if progress is being made. The individual student should compare the quantity and quality of work he is doing at the time with that which he has accomplished previously.

The most commonly used type of evaluation in the Gaston County Schools is the teacher-made test and achievement tests. Table XXVIII shows the distribution of grades

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[10] Ibid.

in the various science classes of five Gaston County High Schools. It will be noted that a large number of the students took agriculture or home economics in place of one or more of the other sciences. These grades were, of course, based on teacher-made tests and teacher judgment. Table XXIX shows the science grades given to individual students from grade seven through the high school science subjects. The records of five boys and five girls selected at random from Gaston County High Schools are traced in this manner. In addition to teacher grades, an achievement test score is also given for each student. Note that none of the ten students elected physics as a subject to be taken in high school.

TABLE XXVIII

GRADES GIVEN TO STUDENTS IN THE VARIOUS SCIENCE CLASSES OF FIVE GASTON COUNTY HIGH SCHOOLS BASED ON TEACHER-MADE TESTS

Subject	Number of students receiving						Number taking home economics or agriculture	Total number receiving credit for science
	A	B	C	D	E	Total		
BOYS' CLASSES								
General Science	18	22	25	7	5	77	23*	100
Biology	26	32	38	4		100		100
Chemistry	4	10	10			24		24
Totals	48	64	73	11	5	201	23	224
GIRLS' CLASSES								
General Science	19	13	8	2	7	49	67**	116
Biology	50	47	21	2		120		120
Chemistry	15	7	8			30	16	46
Totals	84	67	37	4	7	199	83	282

*Boys, of course, took agriculture.

**Girls took home economics.

TABLE XXIX

SCIENCE GRADES OF TEN GASTON COUNTY HIGH SCHOOL STUDENTS
GRADES SEVEN THROUGH TWELVE

Student number	Teacher grades			Achievement test score* (given in ninth grade)	Teacher grades		
	7th grade	8th grade	General Science		Biology	Chemistry	Physics
BOYS							
1	C	C	C	8.8	B	--	--
2	-	B	B	10.3	C	--	--
3	B	B	A	11.0	A	B	--
4	C	A	A	11.0	A	A	--
5	-	A	A	11.0	A	B	--
GIRLS							
1	C	B	--**	8.1	B	C	--
2	B	A	--	8.8	B	--	--
3	B	A	--	9.8	B	--	--
4	B	A	--	9.8	A	--	--
5	A	A	--	11.0	A	--	--

*This score is expressed in grade equivalent.

**The girls chose home economics instead of general science.

CHAPTER VI

EVALUATION AND OUTCOMES OF THE SCIENCE PROGRAM IN GASTON COUNTY

Any attempt to make an exact evaluation of a county science program over a period of five years would be very difficult. Although information received from reports would be somewhat exact, values gained from the instructional program are intangible and are most difficult to measure.

Some of the direct outcomes may be indicated by the amount of audio-visual equipment in each school or available to it; increased use of this equipment for science instruction; an increased collection of books in the science section of the library; selection of new supplementary science readers; requests of teachers for more interesting methods of instruction for use in science classes; students' accelerated interest in science subjects; increase in the number of science experiments in the classroom; a greater number of field trips taken to gain first-hand information on science topics being studied; and collections of selected materials for science study.

More indirect outcomes may result in a greater feeling of security among teachers in using science materials and equipment for which they had not had a great amount of instruction; less hesitancy in attacking science problems;

the willingness of teachers to learn with their students; the feeling of greater confidence in their ability to know where to find information and materials for use in science instruction; and increased readiness to say, "I don't know, but let's see if we can find the answer."

The amount of audio-visual equipment owned by the schools of Gaston County has already been presented in Table XI, page 75. Tables XXX and XXXI, however, show the increase in the use of audio-visual materials from 1950 to 1954, not only in the teaching of science as a separate subject, but also as it was correlated with other school subjects in the Gaston County Schools.

Equipment owned by the various high schools of Gaston County for teaching science is shown in Table XXXII. Figures are given for the years 1950 through 1954. Figure 16 shows the amount spent for supplies and equipment by the nine Gaston County high schools for the years 1950 through 1954.

Table XXXIII gives the number of extra-curricular activities pertaining to science in the various departments of the schools, and lists the number of students participating in each. Table XXXIV gives information concerning the use of library materials pertaining to science by the various departments of the schools--the materials found most useful, and the number of grades reporting their use.

TABLE XXX

INCREASE IN THE USE OF AUDIO-VISUAL EQUIPMENT IN THE VARIOUS DEPARTMENTS OF THE GASTON COUNTY SCHOOLS FROM 1950 TO 1954

Type of equipment	Number of teachers reporting its use							
	Primary		Intermediate		Junior high		High school science	
	1950	1954	1950	1954	1950	1954	1950	1954
16mm projector	9	11	7	30	29	77	16	80
Filmstrip projector	32	41	44	91	34	180	66	87
Tape recorder		3		2		8		2
Wire recorder		2		2		3		1
Opaque projector		12		7		9		7
Bioscope		3		11		11		2
Microscope		8		12		13		9
Science kit		1		4		8		8
Nature charts		8		12		16		6
Radio								
Record player	11	35	5	31		26		4
Totals	52	124	56	202	63	351	82	206

TABLE XXXI

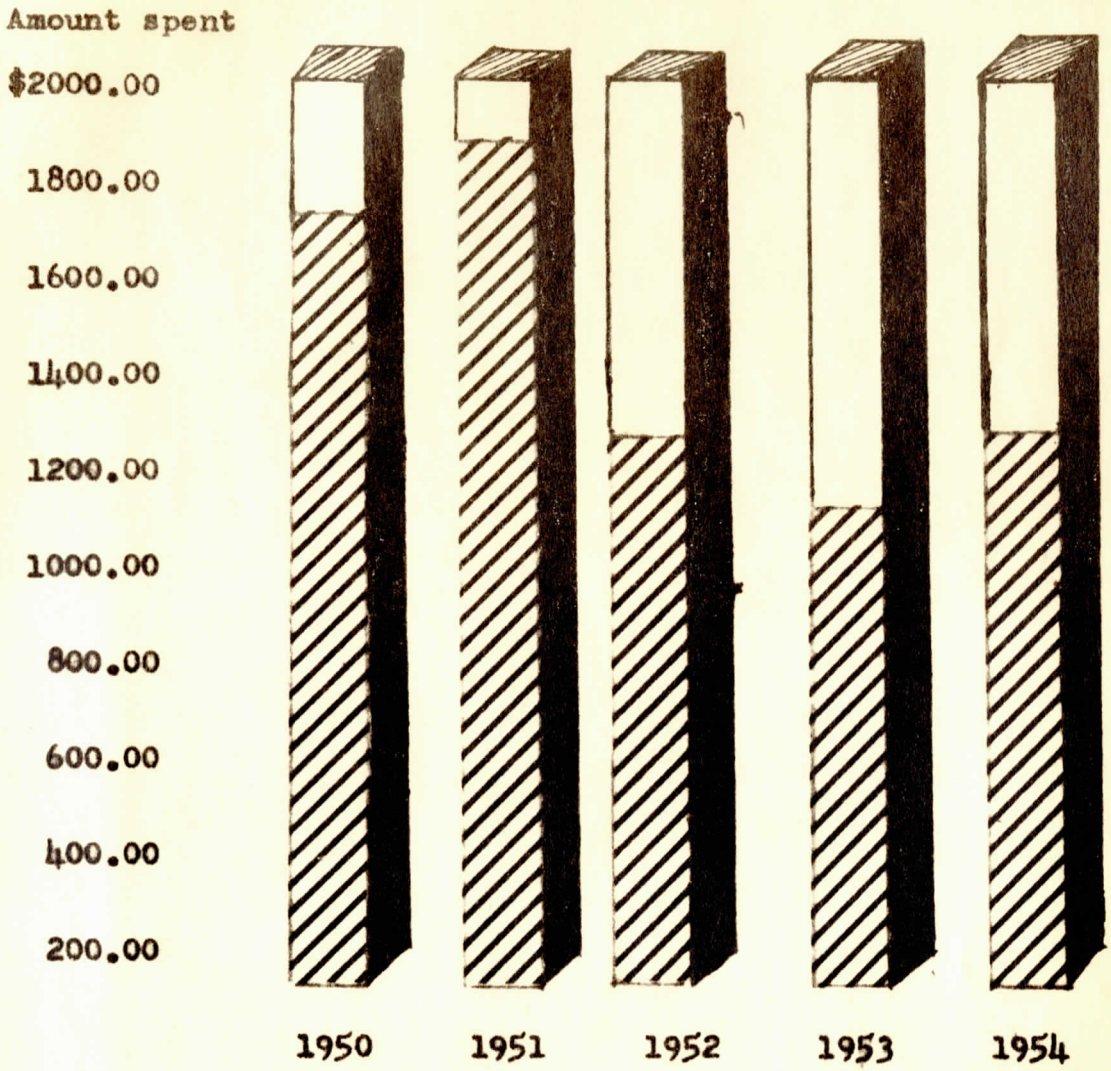
INCREASE IN THE USE OF OTHER AUDIO-VISUAL MATERIALS IN THE VARIOUS DEPARTMENTS OF THE GASTON COUNTY SCHOOLS FROM 1950 TO 1954

Type of material	Number of teachers reporting its use							
	Primary		Intermediate		Junior high		High school science	
	1950	1954	1950	1954	1950	1954	1950	1954
Library books in science	3	12	13	37	20	42		2
Supplementary readers	3	13	16	36	10	62		2
Science magazines		7		24		34		4
Electricity	1	7	15	16	13	69		27
Compass	2	7	1	7	5	9		10
Magnets		6		8		12		
Chemicals			2	5	3	16		8
Machines		4	4	23			2	10
Metals		2	1	1	1	3		
Minerals		1	5	11	5	14		
Indoor collections	23	106	22	143	30	262		27
Outdoor collections	16	76	1	73	12	24		14
Totals	48	241	80	374	99	547	2	104

TABLE XXXII

EQUIPMENT FOR TEACHING SCIENCE IN THE NINE HIGH SCHOOLS OF GASTON COUNTY
1950-1954

Type of equipment	Number of schools having the equipment in				
	1950	1951	1952	1953	1954
Equipment available for experiments in					
General Science	9	9	9	9	8
Biology	9	9	9	9	7
Chemistry	8	9	9	9	7
Physics	6	7	7	8	6
Movies used in teaching science	8	6	8	8	7
Filmstrips used in teaching science	6	7	8	8	8
Good charts for biology	7	7	7	7	7
Microprojector for biology	7	7	7	8	7
Supplementary books purchased	3	3	3	3	4
New science books added to the library	8	8	9	8	7



1950	$1687.97
1951	1835.33
1952	1040.29
1953	891.84
1954	1067.37
Total	$6522.80

FIGURE 16

TOTAL AMOUNT SPENT FOR SUPPLIES AND EQUIPMENT IN THE GASTON COUNTY HIGH SCHOOLS--1950-1954

TABLE XXXIII

PARTICIPATION IN EXTRA-CURRICULAR SCIENCE ACTIVITIES IN THE GASTON COUNTY SCHOOLS
1952

Club	Primary		Intermediate		Junior high		High school science	
	No. of clubs	Enrollment	No. of clubs	Enrollment	No. of clubs	Enrollment	No. of clubs	Enrollment
Audubon	2	58	6	177				
Bird	3	90	6	157				
Wildlife			5	171	5	132		
Science			1	37	3	99	1	20
Conservation					2	56	1	35
Junior Fire Fighting Wardens			1	10				
Totals	5	148	19	552	10	287	2	55

Educational trips	Primary		Intermediate		Junior high		High school science	
	Number of trips	Number taking	Number of trips	Number taking	Number of trips	Number taking	Number of trips	Number taking
Local field trips	66	1980	109	3270	61	1830	19	1900
Distant field trips	9	270	41	240	35	1056	4	848
Totals	75	2250	150	3510	96	2886	23	2748

TABLE XXXIV

USE OF LIBRARY MATERIALS PERTAINING TO SCIENCE BY THE VARIOUS DEPARTMENTS OF THE GASTON COUNTY SCHOOLS--1954

Materials found most useful	Number of grades reporting use of the materials			
	Primary	Intermediate	Junior high	High school science
Encyclopedias	1	2	6	
Books on science	8	11	24	6
Magazines				
Wildlife	7	9	9	1
Nature Magazine	2	6	5	1
National Geographic	4	6	6	1
Life	2	7		1
Scientific American		1	1	1
Audubon	2	4	3	1
Outdoors Illustrated		2	2	
Natural History		1	1	2
Popular Mechanics		4	6	4
Popular Science		2	6	
Field and Stream			2	1
World We Live In			1	
Science News Letter			1	1
Current Science				1
Pamphlets and booklets on science subjects	5	6	8	
Totals	31	61	81	21

In order to break down the information given in Table XXXIV and be a little more specific, Table XXXV gives the exact number of library books pertaining to science which were available to students in the schools of Gaston County in 1950, 1952, 1954, and 1955.

TABLE XXXV

TOTAL NUMBER OF SCIENCE BOOKS IN THE ELEMENTARY AND HIGH SCHOOL LIBRARIES OF GASTON COUNTY

Number of schools	Number of library books pertaining to science available in			
	1950	1952	1954	1955
Elementary				
25	2934	3533	4523	4701
High schools				
9	950	1216	1393	1696
Totals	3884	4749	5916	6397

Table XXXVI gives the number of sets of supplementary science readers found in the different departments of the schools in Gaston County for the years 1950, 1952, and 1954.

TABLE XXXVI

TOTAL NUMBER OF SETS OF SUPPLEMENTARY SCIENCE READERS IN THE VARIOUS DEPARTMENTS OF THE SCHOOLS OF GASTON COUNTY

Department	Number of sets of supplementary science readers owned in		
	1950	1952	1954
Primary	208	232	325
Intermediate	109	151	198
Junior high	64	69	90
High school--science	3	6	8
Totals	384	658	621

It is readily apparent that there has been a steady increase of materials pertaining to science made available to the students and teachers of the schools in Gaston County.

Table XXXVII shows the progression in the addition of basal science textbooks in the various grades of the elementary school. The seventh grade received the new basal science textbook in 1951, the sixth grade in 1953, the fifth grade in 1954, and the fourth grade at the beginning of the fall term of 1955.

TABLE XXXVII

BASAL SCIENCE TEXTBOOKS IN THE DIFFERENT GRADES OF THE SCHOOLS OF GASTON COUNTY
1950-1955

Grade	No. of schools	Number of schools with basal science textbooks in					
		1950	1951	1952	1953	1954	1955
1	25	--	--	--	--	--	--
2	25	--	--	--	--	--	--
3	25	--	--	--	--	--	--
4	25	--	--	--	--	--	25
5	25	--	--	--	--	25	25
6	25	--	--	--	25	25	25
7	24	--	23	24	24	24	24
8	24	24	24	24	24	24	24

Even though science is taught in various subjects almost every day, many teachers seem to feel that they have not had a science lesson unless a certain period is designated for that particular subject. Usually grades are not given on the pupil's report card unless there was a basal science textbook in the grade. Some teachers give the students in their classrooms each year grades on science whether they have a basal textbook or not. They use supplementary readers, library books, articles from magazines, and first-hand information. Table XXXVIII gives an illustration of this problem by tracing the science grades received by twenty-nine students from grade one through grade 8. These

were chosen from a representative school.

TABLE XXXVIII

SCIENCE GRADES GIVEN TO TWENTY-NINE GASTON COUNTY STUDENTS IN GRADES ONE THROUGH EIGHT

Student number	Science grades given in Grade 1	2	3	4	5	6	7	8
Boys								
1				B			C	C
2							C	B
3							C	C
4							B	B
5							A	A
6				A			B	B
7							C	C
8				B			B	B
9				B			A	B
10							B	A
11							B	D
12							A	B
13				B			-*	B
14							C	-
Girls								
15				A			A	A
16							B	B
17							C	B
18							B	A
19							C	B
20							B	B
21				A			A	A
22							B	B
23							D	D
24							B	B
25							B	B
26							A	B
27							B	B
28				B			B	B
29				A			A	A

*This student did not attend this particular school during the grade listed.

The students in the above table had received grades on science in the seventh and eighth grades in which they had used science textbooks as a basal reader. A few of the students had also received science grades in the fourth grade, where there had been no science textbook. There were, of course, several sections of each grade, which accounts for the fact that part of the students received grades whereas others did not.

In another school where there were also several sections of each grade and only eighth and ninth grades had basal textbooks for science, the situation was different. Table XXXIX shows the grades given in this school for grades one through nine.

TABLE XXXIX

SCIENCE GRADES GIVEN TO FOURTEEN GASTON COUNTY SCHOOL GIRLS IN GRADES ONE THROUGH NINE

Student number	Science grades given in Grade								
	1	2	3	4	5	6	7	8*	9*
Girls									
1						A	A	B	B
2					A	A	A	A	A
3						A	B	B	B
4					B	C	C	C	C
5						A	B	A	B
6					A		B	A	B
7					A		B	B	B
8						A	C	C	C
9					A	A	B	B	B
10					A	A	A	A	A
11							B	B	B
12					A		B	A	B
13							B	B	C
14					A	A	B	A	B

*Only grades eight and nine had basal science textbooks.

Apparently, several teachers in grades five, six, and seven, gave science grades based on something other than a textbook.

Figures 17 through 20 give certain information concerning the different science subjects that are customarily taught in the Gaston County high schools. The subjects taught are general science, biology, chemistry, and physics. In these figures, each block represents one high school, and there are nine high schools in Gaston County. The information given has to do with the number of years that specific subject was taught from 1950 through 1954, the number of students enrolled during the five-year period, the number of students leaving school during the five-year period, the total membership the last month of school for the five-year period, the number of students passing, and the number failing for the five-year period.

	HIGH SCHOOL NUMBER								
	1	2	3	4	5	6	7	8	9*
Number of years general science** was taught in the school from 1950 through 1954	5	2	4	5	5	5	5	5	
Number of students enrolled during the five-year period	197	42	241	151	424	953	134	484	
Number of students leaving school during the five-year period	60	3	58	10	47	227	19	98	
Membership last month of school during the five-year period	137	39	183	141	377	726	115	385	
Number of students passing the course during the five-year period	108	39	157	137	355	656	109	343	
Number of students failing the course during the five-year period	29	0	26	4	22	70	6	42	

*No report was received from this high school.

**The basal science text in general science was Science for Everyday Use.

FIGURE 17

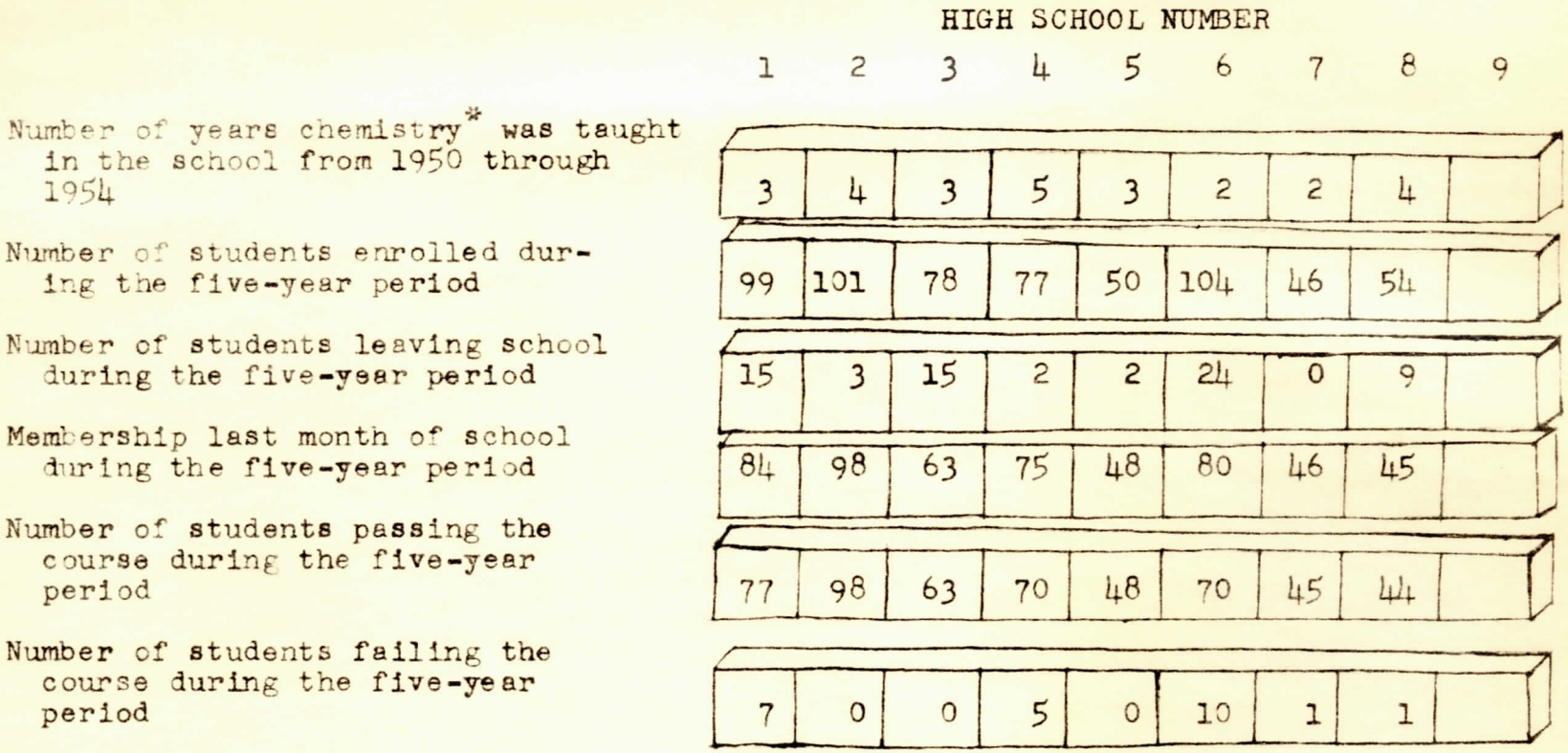
INFORMATION CONCERNING THE TEACHING OF GENERAL SCIENCE IN THE HIGH SCHOOLS OF GASTON COUNTY FROM 1950 THROUGH 1954

	HIGH SCHOOL NUMBER								
	1	2	3	4	5	6	7	8	9
Number of years biology* was taught in the school from 1950 through 1954	5	5	5	5	5	5	5	5	
Number of students enrolled during the five-year period	386	156	348	257	388	1052	240	631	
Number of students leaving school during the five-year period	51	19	130	16	43	319	30	129	
Membership last month of school during the five-year period	335	139	218	241	345	737	210	502	
Number of students passing the course during the five-year period	263	135	211	177	327	681	199	490	
Number of students failing the course during the five-year period	72	4	7	64	18	56	11	12	

*The basal science text in biology was Biology and Human Affairs.

FIGURE 18

INFORMATION CONCERNING THE TEACHING OF BIOLOGY IN THE HIGH SCHOOLS OF GASTON COUNTY FROM 1950 THROUGH 1954



*The basal science text in chemistry was Chemistry for Our Times.

FIGURE 19

INFORMATION CONCERNING THE TEACHING OF CHEMISTRY IN THE HIGH SCHOOLS OF GASTON COUNTY FROM 1950 THROUGH 1954

	HIGH SCHOOL NUMBER								
	1	2	3	4	5	6	7	8	9
Number of years physics* was taught in the school from 1950 through 1954	2	0	4	4	3	2	2	4	
Number of students enrolled during the five-year period	42		105	57	49	73	31	87	
Number of students leaving school during the five-year period	4		10	0	4	12	0	17	
Membership last month of school during the five-year period	38		95	57	45	61	31	70	
Number of students passing the course during the five-year period	36		93	54	43	61	31	67	
Number of students failing the course during the five-year period	2		2	3	2	7	0	3	

*The basal science text in physics was Physics, A Basic Science.

FIGURE 20

INFORMATION CONCERNING THE TEACHING OF PHYSICS IN THE HIGH SCHOOLS OF GASTON COUNTY FROM 1950 THROUGH 1954

A great variety of activities are enjoyed by the students from the primary grades through high school of the schools of Gaston County.

The first grade students pictured below decided to try an experiment to determine conditions necessary for plant growth.

They filled two containers with rich soil and a third one with sand. Into each of these they planted bean seeds, which they tended carefully until they had sprouted. One

container with rich soil and the one containing sand were placed near the windows where the plants could receive sufficient fresh air and sunshine. As soon as the beans had sprouted in the pot of rich soil, it was placed in the closet where the sunshine could not penetrate. All plants were given the same amount of water. After a few weeks they were brought together in order that their growth might be compared.

This experiment gave opportunity for correlation of several school subjects. Reading charts and arithmetic examples were means of keeping records of the growth of the plants. Many new words were learned; art lessons were centered around this project. The children were happy the day they gathered beans from their indoor garden. They were also overjoyed when the educational representative from the Wildlife Resources Commission in Raleigh came to see their work and asked for a picture of this activity to publish in the Wildlife Magazine.[1]

Establishing a nature trail is a most interesting activity, according to the children of High Shoals School. An ideal location for one adjoins their school grounds. For two years the entire student body worked to establish one that could be used as a teaching tool. Signs were made

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[1] Faye McIntosh (comp.), "Conservation in Our Science Program," Wildlife in North Carolina, 43:12, May, 1954.

and erected; interesting activities of nature along the trail were labeled in some interesting way.

Pictured below is a large gully caused by soil erosion. This gully is being watched closely by the students at High Shoals School. Nature is gradually filling it with vines, herbaceous plants, and small trees. Fallen logs across the gully are aiding the situation somewhat.

Near the entrance to the Nature Trail is the location of a wet-weather stream that is rapidly cutting a deep gully down the slope as the water flows on its way to a small

stream at the edge of the wooded area. During a heavy rain this stream becomes a rushing torrent. One of the patrons of the school is helping this group of boys take measurements for a series of check dams that were later built to hold the soil.

Another very interesting project carried out by the fifth grade students of the High Shoals School was the construction and establishment of a weather station on the school ground adjacent to the school building. The boys dug

holes in the ground, poured cement into them as an anchor for the pipes to which the weather instruments or indicators were to be fastened.

Some of the boys, pictured below, mixed cement while others filled the holes where the pipes were to be erected.

MAY · 55

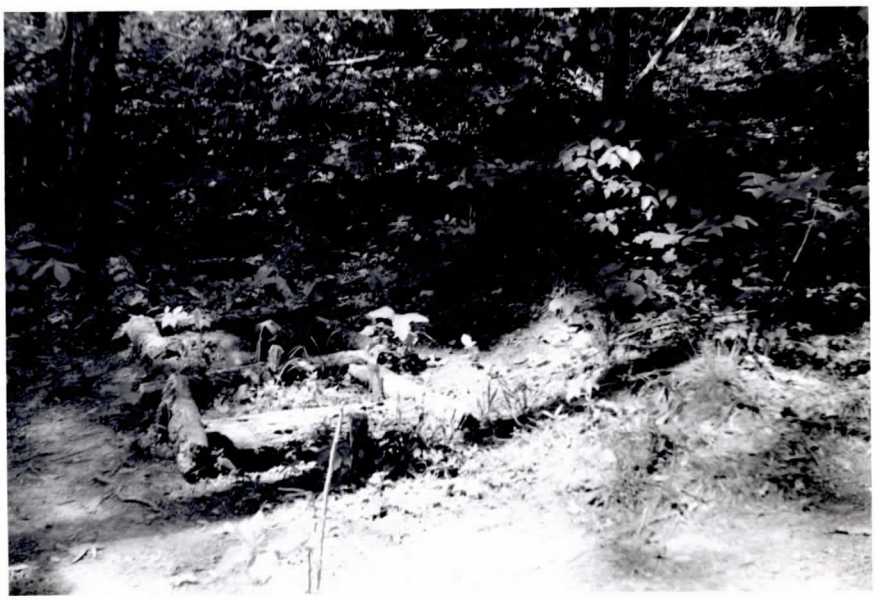
Every member of the fifth grade had some part in the construction of the weather station. Miniature instruments were first constructed for experiments in the classroom. Later, larger ones were made and erected on the posts prepared for them.

This project also afforded many opportunities for correlation with other school subjects. Much measuring needed to be done in order that the weather instruments and the name plate would be in the exact place. The boys pictured below are taking measurements for placement of the weather station sign.

Activities of the children in the primary grades were to mark off plant plots for study, to destroy all vegetation in some, and keep a record of the number of plants that came

in each year, to set out seedlings of trees and keep a record of their growth over a period of several years, and to help construct and care for the "Listening Area."

One plant plot for which the primary children had responsibility was in an area where there had been a pile of sawdust. This area is pictured below. It may be noted that only a few plants are beginning to grow.



After most of the signs had been made and erected on the trail, students wanted to take a trip over it to learn about the various phases on which the other grades had been working.

The fourth grade was one of the first to go on a field trip over the trail. They may be seen in the picture below just as they are preparing to enter the trail. They found something new each time they visited it.

Wildlife needs areas established for them where they can find both food and cover. Many of the old rail fences have disappeared, and with them have gone the food and cover areas for wild birds and animals.

At several schools in Gaston County, students have planted multiflora roses and bicolor lespedeza, not only as food and cover for wildlife but also as a part of school beautification projects.

The seventh grade students pictured below are setting multiflora rose plants around the border of their school ground.

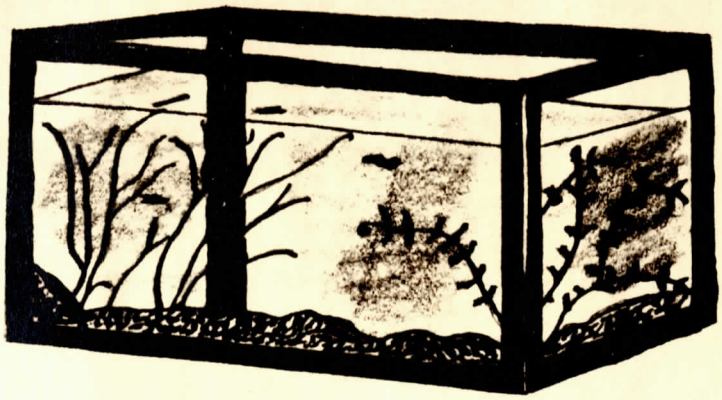
The high school students pictured below have mounted specimens in plastic. They found it a most interesting project.

Terrariums and aquariums are very popular with all departments of the school but especially with intermediate and junior high school teachers and students. Live animals can be kept in them. Science is much more interesting when the study centers around living creatures rather than prepared specimens.

In the picture below two high school students have built a terrarium and are preparing to make it the home of their two pet snakes.

Two of the most popular fish for aquariums are the gold fish and guppies. These students, however, have caught small fish in local streams to keep in their classroom aquariums.

Interest in terrariums and aquariums has gained steadily during the five-year period covered by this study. Figures 21 and 22 show something concerning the interest that



DEPARTMENT	NUMBER OF AQUARIUMS MADE				
	1950	1951	1952	1953	1954
Primary	3	4	6	7	20
Intermediate	3	3	5	5	12
Junior High	1	2	3	4	9
High School--Science					9

FIGURE 21

NUMBER OF AQUARIUMS MADE IN THE SCHOOLS OF GASTON COUNTY FROM 1950 THROUGH 1954

DEPARTMENT	TYPES	NUMBER OF TERRARIUMS MADE				
		1950	1951	1952	1953	1954
Primary	Woodland	1	3	11	6	16
	Marsh			5	6	5
	Desert					
	Hillside					3
Intermediate	Woodland	7	7	25	12	13
	Marsh	2	2	16	2	5
	Desert	1	1	3	2	3
	Hillside	1	1		1	7
Junior High	Woodland	2	2	15	3	11
	Marsh		1	8	2	3
	Desert		1	6	2	2
	Hillside		1		1	2
High School Science	Woodland			1		10
	Marsh			1		
	Desert					
	Hillside					

FIGURE 22

NUMBER OF TERRARIUMS MADE IN THE SCHOOLS OF GASTON COUNTY FROM 1950 THROUGH 1954

has been manifested. Many more have been prepared than are shown in Figure 22. Quite a number of teachers use the gallon jars obtained from the lunchroom for aquariums.

CHAPTER VII

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this chapter was to summarize the data contained in the six preceding chapters, to arrive at certain conclusions concerning this data, and to make certain recommendations based on this data.

Summary. A retrospective view of the study showed that: (1) there is a definite interest in science among both teachers and students of the Gaston County Schools; (2) there is a drifting away from formal textbook science instruction toward a wider field of study which includes many media that broaden the experiences of children in the classrooms; (3) there is a desire among in-service teachers for training in the use of simple and inexpensive materials that are of practical value for classroom instruction; and (4) because of the effect that rapid changes in science are having upon human society everywhere, there is a definite need for a greater understanding of science in order that every person may live a more complete and happy life.

This study has revealed the fact that science has made an impact upon the schools of Gaston County. Interest and enthusiasm are greater than at any previous period within the past several decades. This situation is perhaps due to many

factors. Science affects the lives of people more every day that they live through new modes of travel, new inventions, and through closer contact with other peoples of the world. Science can do much toward helping children understand their place in the world and how they can work with nature to make it a better place in which to live.

New, attractive, and more interesting materials are being placed in the schools for use as supplementary reading to widen the students' field of study and to broaden their knowledge and understanding of various fields of study. These materials are audio-visual aids, supplementary readers, library books, and magazines.

Science programs broadcast over radio and television are also arousing much interest in many fields of science.

Science workshops have given the teachers an opportunity to exchange ideas with other teachers and to actually construct science equipment that can be used in their particular situations to add interest and variety to classroom instruction and make science more meaningful to boys and girls.

At the request of in-service teachers who were interested in learning newer methods, materials, and techniques for use in meeting the needs of all children whom they teach, science workshops were held in Gaston County over a period of five years. Teachers' evaluations of these workshops seemed to show that definite values were gained from them.

Teachers seemed to appreciate the opportunity to become acquainted with teachers from other schools, not only from Gaston County but also from other counties of the state, and to share ideas with one another.

Audio-visual equipment for use in classroom instruction has been provided in all of the schools. This equipment has not been used to maximum capacity as teaching tools, however, perhaps because of a lack of understanding as to the operation of the equipment. Expensive equipment is not necessary to the development of a successful science program, even though it is of great value in broadening children's experiences when it is properly used. Many common materials found near the home, the school, and the business establishments may be used most effectively to accomplish maximum results with little expense.

In a good science program every child in the classroom has an opportunity to make a contribution in his own special way. He may be a keen observer, a collector, an experimenter, an artist, a good reader, a fluent speaker, a natural leader, a successful follower, or gifted in the ability to construct devices for use in experiments and projects. Each of these children can make a valuable contribution to classroom activities, and all members profit through the experiences. The inner feeling of satisfaction and of belonging in the class as a contributing member is of

inestimable value to the individual and to the class as a whole.

Written and verbal statements of approval of workshop activities by teachers who attended the workshops, requests from teachers for assistance in planning work for another year, interest and enthusiasm of students for more science activities and experiments, the willingness of teachers to initiate a science program in their classrooms even though they realize their limitations, and the increased number and variety of activities engaged in by students in every department of the Gaston County schools during the past five years seem to indicate that science workshops have played a great part in the promotion of more successful science instruction. Time is a determining factor as to the far reaching success and the extent of the values gained from the workshops held in the county. As teachers continue to use the newer methods, materials, and techniques with which they became acquainted in the workshops and if their interest and enthusiasm "sparks" other teachers to do likewise, then the values gained from the workshops will multiply greatly.

Not only the teachers from Gaston County have stated that the workshops were of value to them, but teachers from other counties apparently were benefited by having attended. Some of them have reported having had teachers' meetings

in which they were leaders of groups who were interested in science activities similar to the ones they had experienced. Plans were made at these meetings for inclusion of many of the experiences in their own classroom instructional program. Bulletins issued later in the year verified the fact, through the quantity of unique experiences recorded, that their plans had been fruitful.

One fourth grade group of children won first prize at the fair on a booth which they had entered. In this booth was their model volcano, which erupted at certain intervals during the day.

Reports of many other science workshop-inspired experiences have come from teachers who attended the workshops. Evidently, they have been of definite value to the school science program.

Conclusions. This study seemed to indicate that:

Science experiences in the classrooms of Gaston County and other counties from which teachers came to the workshops and shared their experiences with fellow teachers have increased during the last five years.

From the data collected it is obvious that training in the use of newer methods, materials, and techniques for more effective science teaching in the classroom is desired by teachers.

From both oral and written evaluations of workshop experiences, made by teachers who attended, the impression is gained that the science workshop experiences were of definite value.

According to data collected, a greater variety of activities are being used by teachers in their classrooms to make science instruction more interesting.

Greater emphasis is being given to the physical sciences in the elementary schools of today than at any other time during the past several decades.

Science is having a great effect upon the lives of all mankind, regardless of the environment in which he lives.

Science equipment in the schools is not being used to maximum capacity by the elementary teachers, perhaps because of insufficient training in its use.

Sufficient interest has been expressed by elementary teachers desiring special training in science to meet the needs of all the children whom they teach to warrant immediate inclusion of courses designed especially for this purpose in teachers colleges of the state.

The workshop method has been only one avenue through which interest in science has been created.

Tangible values gained through experiences at workshops were more easily evaluated than the intangible ones.

Recommendations. It is the opinion of the writer that more science workshops should be held in which teachers could do a great number of activities, especially in the field of physical sciences. This opinion is based on the writer's experiences in helping to conduct science workshops, where teachers had the opportunity to construct and manipulate materials that would help to make school work more interesting and meaningful to their students. It is also based on information gained through interviewing a great number of teachers who had attended the workshops.

The need is great for training in-service teachers to do the type of projects and experiments that they can use in their teaching. This can best be done by correlating science with other subjects instead of trying to crowd it into an already over-crowded curriculum.

With whom does the responsibility for training teachers lie? To answer that question, one must look to the superintendents, the principals, the supervisors, teacher-training institutions, and to the teachers themselves. The first three of those mentioned have the opportunity to work with teachers during the school year, either directly in the classroom or in workshops. Teacher-training institutions should offer courses designed especially for the elementary school teacher. Some of the teachers colleges are already offering these courses. There is need for more, because the demand in

the number of teachers desiring these courses is increasing.

How can the teachers help themselves? There are many books that are filled with helpful suggestions and plans for science projects. Teachers can use these books effectively in their teaching. A selected bibliography of well illustrated books that have suggestions for carrying out a complete science program in physical and biological fields is found in Appendix G.

Those indicated with a single or double asterisk seemed to the writer to be exceptionally helpful and worthwhile.

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APPENDIX A

QUESTIONNAIRES USED IN STUDY

QUESTIONNAIRE SENT TO TEACHERS OF GASTON COUNTY IN 1952

SCIENCE ACTIVITIES
1952

In order for me to make my yearly report on science work being done in Gaston County, I will need the following information. Will you please check each activity that you have participated in during the past school year, adding others if they are not included in this list, and return the blanks to your building representative by May 14.

Your name_____

School_____ Grade_____

	Activity	Number of pupils participating
1. ____	Balanced aquariums	_____
2.	Terrariums	
____	Marsh type	_____
____	Desert type	_____
____	Woodland type	_____
3.	Field trips to study:	
____	Soils	_____
____	Forests	_____
____	Wildlife	_____
____	Minerals	_____
____	Others: _____	_____
	_____	_____
	_____	_____
4.	Field trips to:	
____	Gaddy's Wild-Goose Refuge	_____
____	Nature Museum in Charlotte	_____
____	Rock Quarry	_____
____	Mine (Tin, gold, etc.)	_____
____	Steam plant _____	_____
____	Boy Scout Museum in Gastonia	_____
____	Camp York, Kings Mountain State Park	_____
____	Camp Cherokee, Kings Mountain State Park	_____
____	Other camp:_____	_____
____	Dairy farm or Dairy	_____
____	Nature Museum in Raleigh	_____
____	Planetarium in Chapel Hill	_____
____	Others: _____	_____
	_____	_____
	_____	_____

5. Resource People:

_____ County Forester - Mr. Clyde Jackson _____

_____ Soil Conservationist - Mr. Seitz _____
Mr. Hanna

_____ Game Protector - Mr. J. D. McLean _____

_____ County Farm Agent - Mr. Kiser _____

_____ District Biologist - Mr. Ray Smith _____

_____ Educational Representative from Wildlife Commission, Raleigh - Miss Barber _____

_____ Others: _____ _____
_____ _____
_____ _____

6. Science Programs:

_____ Radio - WSOC 1:45 each Wednesday
Dr. Heckenbleikner _____

_____ Television
WBTV Nature Museum
Miss Laura Owens _____
WBTV Science program on
Saturday _____

_____ Others: _____ _____
_____ _____
_____ _____

7. Experiments:

_____ Nutrition - White rats _____

_____ Nutrition - Guinea pigs _____

_____ Others: _____ _____
_____ _____
_____ _____

8. Clubs:

_____ Audubon Junior Club _____

_____ Wildlife Club _____

_____ Others: _____ _____
_____ _____
_____ _____

9. Projects and experiments:

_____ Wildlife food and cover:
Multiflora rose Number plants_____ _____
Bicolor lespedeza Number plants_____ _____

_____ School gardens:
Flower _____ _____
Vegetable _____ _____

_____ Erosion control: _____

_____ Soil - At home _____

_____ Soil - At school _____

_____ Reforestation:
At home - Kinds of trees_____ _____
Number of trees_____
At school- Kinds of trees_____ _____
Number of trees_____

_____ Culture pools _____

_____ Model volcano
_____ Chemical weather glass
_____ Barometer
_____ Thermometer
_____ Lightning model
_____ Electric naming boards
Kinds _____
_____

_____ Building: Bird houses - Number_____
Bird feeding stations_____
Bird baths, Water No._____
Sand No._____

_____ Beautification of school grounds:
Planting trees Number_____
Planting flowers Number_____
Planting grass
Others:_____

_____ Ceramics
_____ Hooked rugs
_____ Leathercraft
_____ Metalcraft
_____ Shellcraft
_____ Collections - Exhibits
Insects
Wood
Leaves
Seeds
Fruits
Others: _____
_____

_____ Making slides for the bioscope or microscope
_____ Observation bee hive in classroom
_____ Embedding bones in plaster of Paris
_____ Others: _____
_____
_____

QUESTIONNAIRE USED TO ASCERTAIN VALUE OF SCIENCE WORKSHOPS
IN GASTON COUNTY
TRENDS DURING THE PAST FIVE YEARS

1. Money spent on equipment:		1950	1951	1952	1953	1954
Superintendent:	Elem.					
	H. S.					
Principal	Elem.					
	H. S.					
P. T. A.	Elem.					
	H. S.					
N. C. E. A.	Elem.					
	H. S.					
Others:	Elem.					
_____	H. S.					
2. Films:						
Rental	Elem.					
	H. S.					
Purchased	Elem.					
	H. S.					
Number used	Elem.					
	H. S.					
3. Filmstrips:						
Rental	Elem.					
	H. S.					
Purchased	Elem.					
	H. S.					
Number used	Elem.					
	H. S.					
4. Machines purchased:						
16mm projector	Elem.					
	H. S.					
Filmstrip proj.	Elem.					
	H. S.					
Opaque projector	Elem.					
	H. S.					
Others:	Elem.					
_____	H. S.					
5. Instructional materials:						
_____	Elem.					
_____	H. S.					
_____						
_____						
_____						

1950 1951 1952 1953 1954

6. Extra-curricular activities:

_____	Elem.
_____	H. S.
_____	
_____	

7. Science outcomes:

Success of high school science

Drop-outs

Enrollment

Standardized tests given

Achievement tests given

Change of content	Elem.
	H. S.

9. Change of methodology:(check)

Collections	Elem.
	H. S.
Homemade equipment	Elem.
	H. S.
Resource people	Elem.
	H. S.
Field trips	Elem.
	H. S.
Media of presentation:	
a. Blackboard (Chalkboard)	Elem.
	H. S.
b. Bulletin board	Elem.
	H. S.
c. Flannel board	Elem.
	H. S.
d. Posters	Elem.
	H. S.
e. Films	Elem.
	H. S.
f. Filmstrips	Elem.
	H. S.
g. Pictures (opaque projector)	Elem.
	H. S.
h. Diaramas	Elem.
	H. S.

		1950	1951	1952	1953	1954
i. Models	Elem.					
	H. S.					
j. Recordings	Elem.					
	H. S.					
Methods of presentation						
a. Problem solving	Elem.					
	H. S.					
b. Teacher-pupil planning	Elem.					
	H. S.					
c. Discussion	Elem.					
	H. S.					
d. Experiments	Elem.					
	H. S.					
e. Constructing and manipulating	Elem.					
	H. S.					
f. Observing	Elem.					
	H. S.					
g. Collecting	Elem.					
	H. S.					
h. Consulting authorities	Elem.					
	H. S.					
i. Field trips	Elem.					
	H. S.					
j. Evaluating	Elem.					
	H. S.					
k. Using library books	Elem.					
	H. S.					
l. Using supplementary texts	Elem.					
	H. S.					
m. Using audio-visual materials	Elem.					
	H. S.					
n. Using creative expression	Elem.					
	H. S.					

Please answer the following statements and questions briefly:

1. Problem solving (suggestions: Science for the Elementary School, pages 35-41)

	Yes	No
Did the problem deal with ideas?	___	___
Was it a simple question to be decided based on information?	___	___
Was it a question that required extensive study?	___	___

Problems of each type dealt with:

a. Ideas (year used indicated before each)
Examples: _____
_____

b. Simple questions (indicate year this method was used)
Examples: _____
_____

c. Questions requiring extensive study (year used)
Examples: _____
_____

The problems were solved through: a. Planning_____
b. Discussion_____
c. Reading_____
d. Experimenting_____

2. Teacher-pupil planning (suggestions: Science for the Elementary School, pages 41-48)

Projects planned cooperatively	Year
_____	_____
_____	_____
_____	_____

3. Discussion (suggestions: Science for the Elementary School, pages 49-55)

Subjects for the discussion were chosen by:

Teacher	_____	_____
Students	_____	_____
Both	_____	_____

Topics discussed: _____
_____
_____

Discussions were led by:
Individual students _____
Panel of students _____
Others: _____

Values gained:
a. Power to identify the problem _____
b. Power to evaluate pertinent data _____
c. Power to weigh statements carefully_____
d. Power to choose material selectively_____
e. Power to think scientifically _____
f. Respect for authoritative information_____

Types of discussions:
a. Extemporaneous _____
b. Purposeful _____
c. Well-guided _____

4. Experiments (suggestions: Science for the Elementary School, pages 55-69)

Types of experiments used:	Type	No.
a. Simple	_____	_____
b. Controlled	_____	_____
c. Applied	_____	_____

Examples of experiments done by members of the class:

5. Constructing and manipulating (suggestions: Science for the Elementary School, pages 69-76)

Please check the ones you have done in your science classes or in connection with your science work.

Project	Year
Bird houses	_____
Bird feed station	_____
Compass	_____
Thermometer	_____
Insect net	_____
Weather instruments	
Anemometer	_____
Barometer	_____
Rain gauge	_____
Chemical weather glass	_____
Others: _____	_____
Doorbell	_____
Electric motor	_____
Electric naming boards	_____
North Carolina history	_____
United States history	_____
United States geography	_____
Skeleton	_____
Digestive system	_____
Bird naming board	_____
Others: _____	_____
Calories chart of foods	_____
Solar System	_____

Formicarium _____
Vivarium _____
Aquarium _____
Apiarium _____
Terrarium
  Woodland _____
  Marsh _____
  Desert _____
  Hillside _____
  Others: _____ _____
Volcano _____
Airplanes _____
Ships _____
Ceramics _____
Metalcraft _____
Shellcraft _____
Leathercraft _____
Others: _____ _____
_____ _____

6. Observation (suggestions: Science for the Elementary School, pages 76-82)

Observation to see how things look _____
_____

Observation to see how things act _____
_____

Observation to notice change _____
_____

Observation to notice interdependence _____
_____

Other purposes: _____
_____

7. Collecting (suggestions: Science for the Elementary School, pages 83-86)

1. Outdoor collections

a. For outdoor classroom

Wildflowers _____
Moss _____
Ferns _____
Lichens _____
Rock garden plants _____

Shrubs _____
Rocks _____
Others: _____ _____
_____ _____

b. Nature Trail

Wildflower garden _____
Moss garden _____
Fern garden _____
Lichen garden _____
Wildflower walk _____
Nursery of softwood trees _____
Nursery of hardwood trees _____
Weather station _____
Culture pool _____
Others: _____ _____
_____ _____

c. Others: _____ _____
_____ _____

2. Indoor collections

a. Rocks _____
b. Leaves (autumn) _____
c. Leaves (different shapes and sizes) _____
d. Seeds (ways they travel) _____
e. Seeds (different kinds of seeds) _____
f. Insects (beneficial) _____
g. Insects (harmful) _____
h. Wood of different kinds _____
Softwoods _____
Hardwoods _____
Wood for kindling _____
i. Shells _____
j. Minerals _____
k. Animal tools (teeth, claws, etc.) _____
l. Bird homes _____
m. Insect homes _____
n. Products made from wood _____
o. Paper-made items (paper bags, spoons, cups, plates, wrapping paper, etc. _____
p. Others: _____ _____
_____ _____

8. Consulting authorities (suggestions: Science for the Elementary School, pages 85-93)

A. Local authorities
   1. Textile representative _____
      Project _____
   2. Farmer or conservationist _____
      Project _____
   3. Botanist _____
      Project _____
   4. Electrician _____
      Project _____
   5. Geologist _____
      Project _____
   6. Forester _____
      Project _____
   7. Merchant _____
      Project _____
   8. Dentist _____
      Project _____
   9. Mechanic _____
      Project _____
  10. Druggist _____
      Project _____
  11. _____
      Project _____

B. Outside authorities
   1. _____
      Project _____
   2. _____
      Project _____

C. Other authorities (please give number of each)
   1. Books
      Library _____
      Supplementary readers _____
   2. Authentic visual aids _____
      _____
   3. Others:

9. Field trips (suggestions: Science for the Elementary School, pages 93-99)

A. Nearby trips (give number students taking trip)
   1. Textile plant _____
      Project _____
   2. Farm _____
      Project _____

3. Mine_____
   Project_____
4. Dairy_____
   Project_____
5. Nature Trail_____

(Please check the projects studied)

Balance in nature_____
Interdependence of plant and animal life_____
Variety_____
Adaptation_____
Wildflowers_____
Erosion_____
Waterlife_____
Soils_____
Forests_____
Wildlife_____
Animal homes_____
Animal tracks_____
Others: _____

B. Distant field trips (give number students taking trip)

1. Gaddy's Wild-Goose Refuge_____
2. Nature Museum, Raleigh_____
3. Nature Museum, Charlotte_____
4. Planetarium, Chapel Hill_____
5. Others:_____

C. How were the trips correlated with other subjects?

Language Arts

Arithmetic

Art

Other subjects

10. Evaluating (suggestions: Science for Elementary School, pages 99-103)

1. Did the children find answers to their questions?

2. What books were most helpful?

3. What filmstrips were most useful?

4. What films were most helpful?

5. Could the children relate their experiences to life?

6. List other values gained.

11. Using library books (suggestions: Science for the Elementary School, pages 104-107)

Library materials you found most helpful:

Books

Magazines

Pamphlets

Other materials

12. Using textbooks (suggestions: Science for the Elementary School, pages 107-108)

Science text used in
1950_____
1951_____
1952_____
1953_____
1954_____

Supplementary readers

13. Using audio-visual materials (suggestions: Science for the Elementary School, pages 108-113)
Please check those used.

1. Pictures or flats in texts_____
2. Photographs_____
3. Collected pictures from reliable sources_____
4. Phonograph recordings_____
5. Collected specimens_____

6. Tape and wire recordings_____
7. Black and white slides_____
8. Colored slides_____
9. Filmstrips_____
10. Films_____
11. Live objects (plants and animals)_____
12. Objects not alive: Rocks _____
    Minerals _____
    Plastomounts _____
    Slides for Bioscope _____
13. Machines used:
    16mm projector_____ Bioscope_____
    Filmstrip projector_____ Tape recorder_____
    Opaque projector_____ Record player_____
    Microscope_____ _____
    Magnifying glass_____ _____
    Hand lens_____ _____
14. Others:

14. Using creative expression

1. Chalkboard drawings
2. Chart drawings
3. Slides
4. Paintings
5. Papier Mache models
6. Homemade science equipment
7. Other materials showing creative ability

APPENDIX B

QUESTIONNAIRES, TABLES, AND PROGRAMS PERTAINING TO THE CAMP YORK WORKSHOP

QUESTIONNAIRE SENT TO THE TEACHERS OF GASTON COUNTY
PRIOR TO THE CAMP YORK WORKSHOP

GASTON COUNTY UNIT OF N. C. E. A.

PLANNING AND RESOURCES COMMITTEE

Week-end Trip to Camp York, Kings Mountain, South Carolina
October 18 and 19, 1952

Charges and Payments

30¢ per day per person for use of the camp
Electricity-----regular commercial rates
Cooking gas-----19¢ per gallon consumed
Coal----------at cost (rate of $15. per ton)
Breakage--------camp property broken, lost, or destroyed to be replaced or paid for
Telephone calls-regular rates plus tax

If you plan to attend this week-end trip to Camp York, will you please designate in the space below the day or days you plan to attend so definite plans may be made for those who are going.

October 18	October 18 and 19	Your name

TABLE XL

REPLIES TO THE CAMP YORK WORKSHOP QUESTIONNAIRE

Department	Number replying	Number planning to attend	
		October 18	October 18 and 19
Primary	7	7	3
Intermediate	9	9	7
Junior high	6	6	7
High school science	3	3	3
Others		3	
Totals	25	28	13

TENTATIVE PROGRAM FOR CAMP YORK WORKSHOP

Saturday, October 18, 1952

10:00 a.m.--------Organize into groups for activities

10:30 to 12:00----Group I----------Indoor activities

Group II----------Field trip--Nature Trail

12:00 to 2:00 p.m. ----------Lunch Hour

2:00 to 3:30 p.m.-Group I----------Field trip--Nature Trail

Group II----------Indoor activities

3:30 to 6:00 p.m.----------Free period

6:00 p.m.----------Dinner

8:00 p.m.--------Film on "Wildlife in North Carolina"
shown by educational representative of
Wildlife Resources Commission
Raleigh, North Carolina

APPENDIX C

QUESTIONNAIRES, TABLES, AND PROGRAMS PERTAINING TO THE BELMONT WORKSHOP

QUESTIONNAIRE SENT TO THE TEACHERS OF GASTON COUNTY
PRIOR TO THE BELMONT WORKSHOP

Many teachers of Gaston County are interested in a workshop in which they can take part in activities that will be of practical value to them in their classroom work next year. If you are interested, please give the following information in order that the committee may know the number who plan to attend, so they can plan a schedule to include activities in which teachers are interested.

1. When would you prefer having the workshop?

2. What hours would be most convenient to you?

3. What activities would you like to have included?

The following is a list of possible ones that have been suggested. Please check those in which you would be interested, and add others that you would want included.

_____ Ceramics
_____ Etching glassware
_____ Painting china
_____ Metalcraft
_____ Shellcraft
_____ Leathercraft
_____ Basketry
_____ Rugmaking
_____ Camping
_____ Terrariums
_____ Aquariums
_____ Simple thermometer
_____ Model volcano
_____ Hygrometer
_____ Telescope
_____ Periscope
_____ Barometer
_____ Primary science
_____ Grammar grade science
_____ Inexpensive lantern slide projector
_____ Inexpensive lamps and globes
_____ Making slides for the projector and bioscope
_____ Different ways of preserving specimens - borax, plastic
_____ Musical instruments made from materials found in nature
_____ Making social studies more interesting

_____ How to use the science kit
_____ How to conduct a field trip
_____ How to establish a bird sanctuary
_____ Experiments with simple and inexpensive materials

Please list below any others in which you would be interested.

_____

_____

_____

IMPORTANT: Please give the following information in order that the committee may send to you a copy of the list of activities that will be offered, the time, dates, and place that the workshop will be held.

Your name _____

School_____Grade_____

Teaching address_____

Home address_____

SUMMARY OF THE REPLIES TO THE
BELMONT WORKSHOP QUESTIONNAIRE

1. When would you prefer having the workshop?
   The majority of replies preferred the week preceding the opening of school.

2. What hours would be most convenient to you?
   The greater number of teachers preferred having as many of the activities included as possible, regardless of time.

3. What activities would you like to have included?
   Following is a tabulation of the number of teachers interested in the various activities

Ceramics	72
Etching glassware	17
Painting china	38
Metalcraft	13
Shellcraft	14
Leathercraft	9
Basketry	25
Rugmaking	46
Camping	7
Terrariums	36
Aquariums	36
Simple thermometers	6
Model volcano	13
Hygrometer	4
Telescope	3
Periscope	3
Barometer	7
Primary science	3
Grammar grade science	8
Inexpensive lantern slide projector	7
Inexpensive lamps and globes	30
Making slides for the projector and bioscope	28
Different ways to preserve specimens	33
Musical instruments made from materials found in nature	13
Making social studies more interesting	47
How to use the science kit	18
How to conduct a field trip	35
How to establish a bird sanctuary	9
Experiments with simple and inexpensive materials	11

4. Write-in activities included:
   Guidance
   Conservation
   Primary Sharing Meeting
   Grammar Grade Sharing Meeting

BELMONT WORKSHOP PROGRAM OF ACTIVITIES

	8:00 - 10:00	10:00 - 12:00	12:00	1:00 - 3:00	3:00 - 5:00
Monday August 24, 1953	Announcements Ceramics Rugmaking Leathercraft	Lamps and shades demonstration	LUNCH	Science kit demonstration	Audio-visual techniques
Tuesday August 25, 1953	Ceramics Etching glassware Leathercraft	Making social studies interesting	LUNCH	Mounting specimens in plastic	
	Primary teachers' sharing group meeting				
Wednesday August 26, 1953	Ceramics Etching glassware Basketry	Making lamps and shades Shellcraft Primary science	LUNCH	Metalcraft Primary and kindergarten science	
Thursday August 27, 1953	Ceramics Electric naming boards	Grammar grade science	LUNCH	Elementary school science for the grammar grades	
Friday August 28, 1953	Ceramics Conservation	Guidance Leathercraft	LUNCH	Grammar grade teachers' sharing group meeting	

ACTIVITY	LEADER
Ceramics	Eight teachers from the county schools Proprietor of Ceramic Shop
Metalcraft, basketry and Shellcraft	Representatives from Hobby Shop
Etching glassware	A teacher from county schools
Inexpensive lamps and shades	Home Economist
Audio-visual techniques	Proprietor of Bennett Bros., ltd.
Science kit demonstration	The company representative
Making social studies more interesting	State supervisor Associate, Department of Education
Preserving materials in plastic	Representatives from Biological Supply Co., Elon College
Primary Teachers' sharing group	A teacher from county schools
Electric naming boards	A teacher from county schools A member of a junior class
Model volcano	A teacher from county schools
Hooked rugs	A teacher from county schools
Guidance	State supervisor of guidance service
Conservation	County soil conservationist
Elementary school science	Research associate, Department of Natural Sciences, Teachers College, Columbia University

QUESTIONNAIRE USED IN EVALUATING BELMONT WORKSHOP

Please give your evaluation of the workshop held at Belmont Central School from August 24-28, 1953.

1. Was it of value to you? How?

2. What suggestions have you for improving the workshop?

   a. What activities would you like to have included?

   b. When would you prefer having the workshop?

   c. Do you have other suggestions?

Your name_____

School_____ Grade_____

APPENDIX D

QUESTIONNAIRES, TABLES, AND PROGRAMS PERTAINING TO THE BESSEMER CITY WORKSHOP

QUESTIONNAIRE SENT TO THE TEACHERS OF GASTON COUNTY
PRIOR TO THE BESSEMER CITY WORKSHOP

A workshop will be held in November if a sufficient number of teachers are interested. Some of the activities listed below were requested for the summer workshop, but there was not sufficient time to include all of them. Please check those you would have included in the workshop this fall.

_____ Dramatics and choral reading

_____ Handicraft for children

_____ Music and rhythms

_____ Physical education

_____ Creative art

_____ Field trips

_____ Audio-visual instructional materials

_____ Projects for specific grades

Your name_____

School _____Grade_____

TABLE XLI

REPLIES TO THE BESSEMER CITY WORKSHOP QUESTIONNAIRE REGARDING ACTIVITIES DESIRED

Activity	Number of teachers requesting
Dramatics and choral reading	68
Music and rhythms	64
Physical education	32
Audio-visual instructional materials	48
Total	212

TABLE XLII

REPLIES TO THE BESSEMER CITY WORKSHOP QUESTIONNAIRE REGARDING PROSPECTIVE ATTENDANCE

Department	Number of teachers interested in attending
Primary	92
Intermediate	78
Junior high	55
High school	21
Principals	10
Total	256

BESSEMER CITY WORKSHOP ANNOUNCEMENT

Many teachers who could not attend the Belmont Workshop have asked for one to be held in November.

The committee has planned an interesting program of activities suggested by the teachers on the last questionnaire.

The grammar grade teachers were unable to have their "Sharing Meeting" at the workshop this summer, so they are planning a meeting for Tuesday, November 17, 1953. You have splendid ideas that you may share with other teachers. Please plan to set up exhibits of some of the projects you have been working on since school began. This meeting will be a wonderful opportunity for you to learn to know other teachers in the county and to share ideas with them.

TENTATIVE SCHEDULE FOR THE NOVEMBER WORKSHOP

3:40 - 4:30 p.m.	Music for the first four grades Audio-visual education for the grammar grades, junior high, and high school teachers
4:35 - 5:30 p.m.	Music for grammar grades, junior high, and high school teachers

The grammar grade sharing meeting will be from 3:40 p.m. until 5:00 p.m. on Tuesday, November 17, 1953.

7:00 - 8:00 p.m.	Dramatics and choral reading for the first four grades Physical education for the grammar grades, junior high, and high school
8:00 - 9:00 p.m.	Dramatics for the grammar grades, junior high, and high school Physical education for the first four grades

Please send a list of the names of the teachers planning to attend the workshop to the county school office in order that final plans may be made for the classes.

BESSEMER CITY WORKSHOP PROGRAM OF ACTIVITIES

Time	Monday	Tuesday	Wednesday	Thursday
3:40 - 4:00 p.m.	Audio-visual techniques	Music grades 1-3 Grammar grade teachers' sharing meeting	Music grades 1-3 Audio-visual techniques grades 4-8	Music grades 1-3 Audio-visual techniques grades 4-8
4:30 - 5:30 p.m.	Physical education for classroom or party Rhythms	High school science meeting Commercial teachers' meeting	Music grades 4-8 Audio-visual grades 1-3	Music grades 4-8 Audio-visual grades 1-3
7:00 - 8:00 p.m.	Choral reading grades 1-8 Practice reading, grades 1-3	Creative dramatics grades 4-8 Physical education, grades 1-3	Choral reading, grades 4-8 and practice reading	Creative dramatics grades 1-3 Square dancing grades 4-8
8:00 - 9:00 p.m.	Creative drama senior high school	Choral speaking grades 7-12 Games, grades 4-8	Religious drama high school Relays	Dramatic appreciation high school Square dancing

GRAMMAR GRADE TEACHERS' SHARING MEETING DISPLAYS
AT BESSEMER CITY WORKSHOP

GRADES	MATERIALS ON DISPLAY
Eighth grade students	History on parade Ships that made history
Eighth grade teacher	Health Bones mounted in plaster of Paris
Eighth grade teacher	Science Aeroplanes made by students
Seventh grade teacher	Science Natural wool dyeing
Seventh grade teacher	Science and health Electric naming boards
Fourth grade teacher	Science Coal gardens
Eighth grade teacher	Social studies Relief maps made by students
Seventh grade teacher	Social studies and science Cotton thread and materials made from cotton
Sixth grade teacher	Science Flowers preserved in borax
Eighth grade teacher	Social studies The Lost Colony
Eighth grade teacher	Science Soap carving
Eighth grade teacher	Literature Raggedy Man characters made by the students

APPENDIX E

QUESTIONNAIRES, TABLES, AND PROGRAMS PERTAINING TO THE PEEDIN SCHOOL SCIENCE WORKSHOP

QUESTIONNAIRE SENT TO THE TEACHERS OF GASTON COUNTY
PRIOR TO THE PEEDIN SCHOOL SCIENCE WORKSHOP

1. Are you planning to attend the science workshop to be held at Peedin School in Gastonia on August 23-27, 1954?

2. Which group do you plan to attend? (Primary, Intermediate, Junior high)

3. Do you want lunch served?

Your name_____

School_____Grade_____

TABLE XLIII

REPLIES TO THE PEEDIN SCHOOL SCIENCE WORKSHOP QUESTIONNAIRE REGARDING PROSPECTIVE ATTENDANCE

	Number planning to attend		
	Primary	Intermediate	Junior high
Teachers	70	81	43
Supervisors	4	4	1
Totals	74	85	44

TABLE XLIV

COUNTIES AND CITIES REPRESENTED AT PEEDIN SCHOOL SCIENCE WORKSHOP

Place	Number of schools represented	Number of teachers	Others
Gaston County	21	148	2
Lincoln County	1	3	1
Lincolnton	2	4	1
Gastonia	8	20	4
Albemarle	4	12	2
Cherryville	2	5	
Montgomery County			1
Shelby	1	4	
Cleveland County	14	45	2
Kings Mountain	3	11	1
Totals	56	252	14

PEEDIN SCHOOL SCIENCE WORKSHOP ANNOUNCEMENT

A science workshop will be held at Peedin School in Gastonia from August 23 through August 27. Each day there will be a morning session from 9:00 a.m. until 11:00 a.m. and an afternoon session from 2:00 until 4:00 p.m.

This is the second summer that a full week has been devoted to a science workshop as part of a continuous planned program of in-service education requested by and initiated for the elementary and high school teachers of Gaston County. Last year the workshop was held at Belmont Central School. This program has been worked out in a long-term program for improvement of science instruction in keeping with the philosophy and procedures advocated in the new science bulletin issued by the State Department of Public Instruction.

The leaders for this workshop are a general supervisor of instruction for Gaston County schools and an instructor of Natural Sciences for Teachers College, Columbia University in New York, visiting professor of Education at Appalachian State Teachers College in Boone, and co-author of the elementary school science text entitled Experimenting in Science. This book is the sixth grade text of the new science series, Science Today and Tomorrow, published by Ginn and Company in 1954.

While the instructor is in Gaston County, he will speak to civic clubs on the following topics:

"Science--Its Effect Upon Our Lives"

"Science--Its Effect Upon the Education of Our Children"

"A Look at the Southern District--Its Heritage and Potentialities for Leadership"

PEEDIN SCHOOL SCIENCE WORKSHOP PROGRAM OF ACTIVITIES

MONDAY

Morning Session -- 9:00 to 11:00 a.m.

Organizational meeting for the first hour.

Possibilities for small group participation in actual manipulation of materials used in the larger group.

Discuss briefly the organization of a broader program of science for the elementary school.

Specific examples will be developed and some emphasis will be placed on the use of the globe in developing basic science conceptions for primary as well as intermediate grades.

Afternoon Session -- 2:00 to 4:00 p.m.

Magnetism--Concepts relating to magnetism will be developed in relation to children's experiences in the primary as well as the intermediate and junior high schools.

Evening Session -- Orthopaedic Hospital

Work with the children in relation to the two areas developed in the morning and afternoon sessions at the workshop.

TUESDAY

Morning Session -- 9:00 to 11:00 a.m.

Aquariums--Construction of an aquarium suitable for work with elementary school children will be demonstrated. Certain practical suggestions as to maintenance and care of the aquarium will be indicated.

The discussion will develop possible uses of the aquarium as a teaching device for boys and girls from kindergarten through the eighth grade. Opportunity will be given for construction of the aquarium in small group meetings.

Afternoon Session -- 2:00 to 4:00 p.m.

Terrariums--There will be a discussion of methods and techniques for working with children on field trips. The terrarium will be discussed in relation to field work with children in the primary, intermediate, and junior high school.

The construction of a simple and inexpensive terrarium will be demonstrated--"Hillside Terrarium."

Possibilities for other types of terrariums will be explored. Teachers will be given opportunity to construct terrariums in small groups.

WEDNESDAY

Morning Session -- 9:00 to 11:00 a.m.

Topic for morning session will center around the use of discussion and stimulation of imagination, the use and function of a program of science in elementary school.

Specific examples and techniques will be developed from the area of our earth, its relation to the solar system and the Milky Way.

Materials suitable for use in elementary school programs will also be selected from the area of rocks and soils.

Afternoon Session -- 2:00 to 4:00 p.m.

Use of filmstrips in the elementary school program; the discussion will center around topics already discussed on previous days.

Films suitable for use with the materials previously demonstrated will be presented.

There will be other films and filmstrips available for showing in small groups.

Evening Session

Picnic at Rankin Lake for members of the workshop and their families. Please bring picnic lunch. Drinks will be provided.

THURSDAY

Morning Session -- 9:00 to 11:00 a.m.

The discussion will be devoted to concepts of weather for young children, especially primary children.

Noon Hour -- 12:30 to 1:30 p.m.

The instructor will be guest speaker at the Rotary Club luncheon.

Afternoon Session -- 2:00 to 4:00 p.m.

Weather for older children--specifically for intermediate and upper grade children.

Evening Session -- 6:30 p.m.

The instructor will speak to the Mount Holly Civic Club members at the Lions Club Building.

FRIDAY

Morning Session -- 9:00 to 11:00 a.m.

Discussion will be centered around the use of textbooks and other written materials suitable for the elementary school.

Actual demonstrations will be given in relation to the use of material in a unit on machines for the primary grades.

Afternoon Session -- 2:00 to 4:00 p.m.

Discussion will center around the area of electricity. Simple methods and techniques suitable for primary, intermediate, and junior high school will be discussed in detail.

The latter part of the discussion will center around the future use and possibilities of the Gaston County ponds in the elementary science program.

APPENDIX F

QUESTIONNAIRES, TABLES, AND PROGRAMS PERTAINING TO THE HIGH SHOALS WORKSHOP

QUESTIONNAIRE SENT TO THE TEACHERS OF GASTON COUNTY
PRIOR TO THE HIGH SHOALS WORKSHOP

Dates set for the workshop April 26, 27, and 28, 1956

Place High Shoals School

Name of your school_____

How many teachers from your school plan to attend?

_____ Primary

_____ Intermediate

_____ Junior high

_____ High school--science

Which hours do you prefer?

_____ 3:45 - 5:00 p.m.

_____ 4:00 - 5:30 p.m.

_____ 7:00 - 8:30 p.m.

_____ 7:30 - 9:00 p.m.

_____ Saturday morning

_____ Saturday afternoon

Would you be interested in having a light meal served?

_____ Thursday

_____ Yes

_____ No

_____ Friday

_____ Yes

_____ No

Are you going on the field trip Saturday morning? _____Yes _____No

Are you planning to stay for breakfast at 8:00 a.m.?

_____Yes _____No

TENTATIVE PROGRAM FOR HIGH SHOALS SCIENCE WORKSHOP

Thursday morning----------Classroom visitation
Workshop instructor

Thursday afternoon----------Conservation of wildlife
3:45 - 5:30 p.m.
Representative from
Wildlife Commission,
Raleigh, North Carolina

Thursday evening----------Field trip and nature trail
7:00 - 8:30 p.m.
possibilities
Workshop instructor

Friday morning----------Visit with children at
9:00 - 11:00 a.m.
Orthopaedic Hospital
School

Friday noon----------Victory School

Friday afternoon----------Field trip to the nature
3:45 - 5:30 p.m.
trail
Workshop instructor
Classroom visitation
Student guides

Friday evening----------Field trip and nature trail
7:00 - 8:30 p.m.
experiments

Saturday morning----------Field trip
6:30 - 7:45 a.m.

8:00 a.m.----------Breakfast

HIGH SHOALS SCIENCE WORKSHOP EXHIBITS
IN THE CLASSROOMS

Classroom	Exhibits
Primary grades	Collections of animal tools and weapons; teeth and claws mounted on tagboard and in plaster of Paris Simple machines: elevator, a well, a windlass, scissors, plyers, and many kinds of tools Mold of different kinds Magnets Aquariums and terrariums Bird cafeteria Birds of many kinds on bulletin board Doll playhouse Stones of various kinds Potted plants
Fourth grade	Light Experiments showing that plants need light Reflected and refracted light Different ways of producing light Sources of light Hand-made filmstrip projector Hand-made telescope Prism separating light into various colors
Fifth grade	Electricity Doorbell, hand-made Fuses Open and closed circuits Tape recorder Electric multiplication table Electric map of United States Electric piano keyboard used for teaching the lines and spaces on the staff

Sixth grade

Sound
- Nature in music
  - Musical instruments made from materials in nature
    - Broomstick xylophone
    - Flowerpot chimes
    - Hand-made harp
    - Stethoscope
    - Organs of hearing - ears of various kinds
    - Waterfall
    - Instruments of the orchestra
    - Tambourines
    - Horn trumpet
    - Cigar box guitar
    - Bells

Seventh grade

Solar System
- Planets made on stands with the correct number of satellites rotating around each one
- All phases of the moon, each on a separate stand
- A hand-made orrery for showing the eclipse of the sun and moon
- Stars cut from aluminum foil, painted with phosphorescent paint and fastened to the ceiling in the form of the constellations
- Time zones with clocks set at the correct time for each zone

Exhibit on trees and products from trees

Exhibit of birds of the fields, streams, woodlands, meadows, lawns

Eighth grade

Conservation
- Stream showing clear water in which fish could live and grow, and polluted water where there were no fish
- A miniature pond in an aquarium
- Exhibit of pictures of wild flowers that should not be picked
- Conservation poster built in relief
- Conservation practices--soil, water, forests, wildlife, food chains

APPENDIX G

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